# SUPPLEMENT.


# The Mining Journal,

## AILWAY AND COMMERCIAL GAZETTE:

**FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.**

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# Original Correspondence.

## THE IRON ORE MOUNTAINS OF LAPLAND.

Swedish Lapland, it is well known, contains some immense deposits of iron ore, which have hitherto lain unworked on account of their inaccessible position. A proposal has been made to open up this extensive mining field by constructing a line of railway from the head of the Gulf of Bothnia to the Atlantic. In consequence of this proposal the Swedish Government ordered a survey of these enormous deposits to be made. This was done last summer. The samples of ore collected have been analysed during the winter, of the results of which we propose to give a short account, supplemented from other reliable sources which have just been made public.

Gellivare is the best known of the iron mountains of Lapland. After passing through several hands subsequently to its discovery, it became, in the beginning of the present century, the property of Baron Hermelin, one of the most enterprising men that Sweden ever produced. From his hands it passed into those of Bernadotte, then Crown Prince, and afterwards King of Sweden under the title of Charles XIV. It was sold by his son and successor—Oscar I.—to a syndicate of Swedish and Norwegian men of business. Since then it has often changed owners. It was bought, along with immense tracts of forest, in 1864 by the Gellivare Company (Limited) for 225,000*l.* The capital of this company amounted to 500,000*l.*, divided into 10,000 shares of 50*l.* each. The company undertook, in consideration of a grant by the Swedish Government amounting to nearly 46,000*l.*, to canalise the River Lule to a certain point, and to construct a railway from that point to Gellivare. This, however, the company found itself unable to perform, and it was in consequence wound up, and the property sold to the New Gellivare Company (Limited), in 1869, for about 43,000*l.* The ore mountain is now the property of an English merchant resident in Stockholm.

"This field (says the report), the most extensive in Sweden, and as large as all the other fields in Lapland put together, is not, properly speaking, an ore mountain, but a mountain with beds of ore, occupying an area of 7,400,000 square feet, or 1-80th of its surface. The ore is both magnetite—often richly interpersed with apatite—and hematite, for the most part coarse grained, the latter as layers enclosed in the former, without any sharp boundary. The gangue is red gneiss. The iron contents of these ores is in general very large. Of the 41 average samples which have been collected and analysed, 26 showed by the dry assay upwards of 70 per cent. (one up to 74·3 per cent.), 13 between 60 and 70 per cent., and only 2 under 60 per cent. (the lowest 50·3 per cent.) Unfortunately, the contents of phosphorus rises in most of them to a high percentage, 28 holding upwards of 0·1 per cent. (varying between 1·727 and 0·104 per cent., the average being 0·515 per cent.), 3 between 0·1 and 0·05, and 10 under 0·05 per cent. (the lowest 0·011). Although the hematite appears to contain much less apatite than the magnetic iron ore, it holds, however, as much phosphorus. The contents of sulphur, on the contrary, is exceedingly small, 9 of the samples containing over 0·05 per cent. (the highest 0·18 per cent.), 20 contained 0·05 per cent. or under, and in 12 this impurity was found to be completely absent. The contents of manganese, which always increases the value of an ore, only amounts to 0·15 per cent. The contents of titanic acid varies between 0·45 and 1·91 per cent. This ingredient is not detrimental to the iron, but causes certain metallurgical inconveniences.

By sinking only 1 ft. over the whole mountain, 925,000 tons of iron ore might be obtained, whence could be produced as much iron as is yearly worked at present in the whole of Sweden. Of this area there are, however, only 1,074,000 square feet so free of the phosphorus that they are adapted for the production of Bessemer metal; but, on the supposition that the same proportion holds good underground as on the surface, 134,000 tons of ore suitable for this purpose could be broken up by sinking 1 ft. It may be remarked that though in the processes by which malleable iron is commonly manufactured in Sweden a content of phosphorus of 0·01 is considered large, iron quite suitable for common purposes may be produced, especially by the method of puddling, from much more impure ores, and for some kind of castings ores containing phosphorus have a decided preference over others, not only on account of the fusibility of the pig-iron made from them, but also on account of its not rusting so readily as other kinds of pig."

Kiirunavaara lies about 16 English miles from Jukkasjarvi Church, and 10 miles from Torne River. It consists of a nearly straight ridge running into summits of different heights, which all consist of compact magnetic iron ore, forming a bed in porphyry-like helleflinta, and mixed here and there with hematite, which extends almost without interruption for 14,000 ft., has a variable breadth of between 185 and 780 ft., and occupies an area of 3,526,000 square feet. The average samples brought from it show a content of pig-iron of between 70 and 73·12 per cent. in 12, of between 65 and 70 per cent. in 13, and of less than 65 per cent. only in three, the lowest giving 61·5 per cent. The content of phosphorus is large; 24 samples ranging between 0·305 and 2·802 per cent., the average being 1·396 per cent.; in the other four, which are from the end-points of the bed of ore, 0·030 and 0·047 per cent. The content of sulphur amounts to 0·03, 0·15 per cent.; of manganese to 0·15 per cent., and of titanic acid to 0·32, 0·60 per cent. The quantity of ore has been calculated at 84,442,000 tons in the summits, 170,917,708 tons below these, down to the level of the lake Luossajärvi, and 440,000 tons for every foot sunk below that. Of ore of the best quality, on the supposition that it continues underground of the same purity as at the surface, 14,412,291 tons in the summits, and 42,237,000 tons from their base to the level of the lake.

Luossavaara lies immediately to the north of the mountain just described, and was discovered at the same time. It is of a conical form, and the rock is for the most part covered with earth. The bed of ore extends 4500 ft. in length, the greatest breadth being 155 ft., and the area 559,000 square feet. The iron contents in five of eight average samples was 70—73 per cent., in the other three 67·4—69 per cent. The content of phosphorus was found to be very low, being in two 0·003 and 0·008 per cent., in other two under 0·02 per cent, in other two under 0·03 per cent., and only in the two remaining higher than 0·05 per cent. (0·057 and 0·082 per cent.); the content of sulphur ranges from 0·03 to 0·09 per cent.; the content of manganese amounts to 0·15 per cent., and of titanic acid to 0·94 and 1·09 per cent. The quantity of ore in this remarkable mountain is calculated at 27,000,000 tons down to the level of Luossajarfvi Lake, and about 70,000 tons for every foot deeper; and thus, if to the ore in this mountain there were added that of the finest quality in Kürunnavaara, there might be a yearly production of 800,000 tons for a whole century, without going below the surface of the lake.

Svappavaara is situated about 25 English miles to the south-east of Luossavaara. Ore was first discovered here in 1654, by a Laplander, and between that date and 1686 a large quantity of copper ore was mined. The production was so considerable that a mint was established at which copper money was coined, as much as 150 tons of copper having been made in the year. Some of the sinkings reached a depth of 312 ft., but the influx of water then became too great for the appliances at the command of the miners at that date, and the mines were abandoned, while abundance of good ore was still found in the lowest part of the mines. The copper ore occurs here partly in the form of true beds—of peacock and grey ore, of cuprite and cupreous pyrites, of the same age as the surrounding rock—grey, fine-grained, mica-schist and quartzite—partly as later formations in the form of veins, &c., of malachite, and exceptionally of "copper lazur." The iron ore, part hematite, part magnetic iron ore, rendered impure only exceptionally by a few particles of pyrites, forms the highest part of the mountain, and has a length of 2100 ft., a breadth of 180—330 ft., and an area of 424,000 square feet. The six crucible assays show 64—69·5 per cent. of iron in the magnetic iron ore (three samples), 50·5 and 58 per cent. in the hematite, and 72·3 per cent. in the hematite sand. The content of phosphorus is uncommonly great—in the three samples of magnetite 0·9—1·547 per cent., in the hematite 0·251 and 1·462 per cent., and in the hematite sand 0·129 per cent.; the content of sulphur is pretty high, in four of the samples 0·15 per cent., in the two others 0·06 and 0·07 per cent. The content of manganese amounts to 0·14 per cent., and of titanic acid to 0·75 and 0·72 per cent. The summit of the mountain contains, according to calculation, the large quantity of 6,533,540 tons. If the iron ore comes to be worked it is probable that the copper ore also may be mined to a greater or less extent, otherwise not.

Sjangeli, a mountain situated on the Norwegian frontier about 30 English miles from the Atlantic, has been famed as containing rich copper ore in several parallels, but this ore is considered by the reporters to be too limited in quantity, and so distributed through a mass of sterile materials as not to admit of being worked with a profitable result.

From the analyses quoted, and the calculations founded on them, it appears that the iron ores of Lapland are very rich, and that although for the most part they contain too much phosphorus to be suitable for the production of Bessemer metal, there are also supplies of pure ore which, from a practical point of view, may be considered as inexhaustible. This conclusion indeed is grounded on the supposition that the quality of the ores is the same underground as at the surface, but especially as far as phosphorus, the most undesirable impurity, is concerned there is no reason for supposing that it increases downwards, but rather the contrary, to judge by the state of things at "Fredrika's opening" at Gellivare, where the ore at the surface showed a content of phosphorus of 0·374 per cent., but at a depth of 16 feet of only 0·031 per cent. Complete certainty on this point can, however, be obtained only by direct examinations of samples from different depths.

Improved communications are an indispensable requisite for the utilisation of these immeasurable resources, preferably a line of railway running through the ore fields from the Gulf of Bothnia at Lulea to the Ofoten Fiord in Norway, which is always open during winter. Preliminary surveys have shown that the ground is favourable for such an undertaking. The railway, 264 English miles long, is estimated to cost about 950,000*l.*

Were this railway made, the Gellivare ore would probably be transported towards the Gulf of Bothnia, and the other ores to Norway, where there is abundant water power for working them. The cost of manufacture here ought not to exceed 56s. per ton (including 2s. 6d. profit per ton), thanks to the low cost of mining, which, in consequence of the uncommonly advantageous position of the ore, and its occurrence in large masses, ought not in the case of the deposits in Jukkasjärfvi parish to exceed 2s. 6d. per ton, whence again it follows that the quantity of ore to be transported would be so large that the construction of the railway might be grounded upon it. In calculating the cost of manufacture, which comes out little higher than the quotations of the most inferior English pig, a quantity of coke is supposed to be used equal to that of the pig produced, and the price of the coke, 30s. per ton, is put high enough to allow of full return freight from England. But if the manufacture of iron were set a going on the spot the vessels that brought coal or coke from England would obtain return cargoes of iron and of iron ore, the export of which would probably be very profitable. The cost of working the Gellivare ore would be slightly higher, as the cost of mining would probably be about 50 per cent. more than in the former case, and the cost of coke somewhat greater.

The formation of the railway, on which the future development of the mineral resources of Lapland depends, can only be carried out as a Government undertaking, but the benefits that might reasonably be expected to follow are so great that it is not improbable that it will be so carried out.

## SALTPETRE, BLACK LEAD, AND ASBESTOS.

SIR,—Will you allow me to point out to the trading communities of all nations the extensive asbestos mountains near Hardcastle, in South Africa? This substance, I propose, being reduced into fine filaments and kneaded with clay, and then subjected to hydraulic pressure, may be formed into bricks, &c., capable of resisting sudden alternations of heat and cold.

2. Nitre, again, is found in abundance in Pella, in South Africa.

3. BLACK LEAD.—Extensive mines of this exist in the "Black" or "Shining" mountains, and in caverns on the road to Lattakoo. And here, likewise, crystals of surpassing beauty are to be found in immense quantities, which might serve to adern the "exterior" of the houses of the wealthiest. The *coup d'œil*, when the sun shone on them, would rival Solomon in all his glory. JAMES BRUCE

*July* 10. (late 33rd Regt.).

## ROCK-BORING MACHINERY.

SIR,—As a constant reader of your valuable Journal, the letter of Mr. Matthew Loam to Mr. Charles Fox did not escape my attention. I have also read the letter of your correspondent, "K," in the Supplement to last week's Journal, and my opinion is that the writer of that letter has disparaged himself instead of Mr. Loam. Were I to emulate the spirit of "K," when, speaking of Mr. Loam's letter, he stated "This very confident style of writing might have been allowed to pass into merited oblivion had it not been for a certain air of authority assumed by the writer," &c., I should say of the letter of "K" that it might be allowed to pass into merited oblivion if it were entitled to such respectful repose. And if it were not the duty of every lover of truth and justice to protest against the treatment of an important practical question in such a spirit as he has done. May I ask your correspondent wherein consisted the "assumption" of which he speaks, and which appears to have given him so much umbrage? I read the letter as a private communication from one gentleman to another on a subject in which both were deeply interested, but subsequently published by mutual consent.

Is it for a moment to be supposed that Mr. Chas. Fox would be a party to publishing a letter, even with the consent of the writer, if he saw in it "an assumed air of authority," or any other unjustifiable assumption, and is it reasonable to suppose that a person of Mr Fox's acumen would fail to detect it if it were there? It is true there appeared a positiveness in the tone of expression, but which I regarded as having proceeded from the strength of personal conviction, animated somewhat by enthusiasm begotten of good feeling. I fail to see what there is illogical in conforming to conventionalism and calling a borer invented at Barrow "the Barrow Borer," notwithstanding it may have been devised by a Cornishman, but who had been 20 years resident in that locality, or what there is inconsistent in Mr. Loam's connection with the Basset Premium Committee—"To the pure all things are pure." If that gentleman is incapable of exercising an unbiassed judgement as a juror in respect of the merits or rival claims of boring machines simply because he had previously expressed an opinion concerning one in the absence of the others, as practical competitors very few men would be competent to act as jurors.

An opinion so expressed is an *exparte* one, and is usually so understood by every intelligent person entertaining it, and they hold themselves no more bound by it in the presence of altered circumstances than if they had never expressed it. But I presume "K" was not cognizant of that fact. If prepossession is what he deprecates he has betrayed it in its most virulent form. His sarcasm, and manner of sneering too, is most reprehensible. He seems not to be aware that it does not require much talent to sneer, nor much breadth of knowledge to indulge in censure, those distinctions are usually found associated with the most repulsive forms of ignorance, but he appears happy in their possession. If he has nothing better to deal in than such vituperative and malevolent censoriousness he had better leave the merits of the Kainotoman Borer to be represented by someone else. If it has superior merits they will not fail to be recognised. The great desideratum now is to establish the fact that boring machines are applicable, or may be made so, to the general purposes of deep mining.

If there were no difficulties why, it may be asked, do the promoters of boring machines require a premium over manual labour for introducing them. The fact that such is offered is a direct challenge to boring machines, and goes far to show that the alleged prejudice of Cornishmen to the introduction of new schemes merely applies to impracticable ones, or those difficultly practicable. What can be fairer or more liberal than to invite the promoters of boring machines to prove their efficiency and adaptability to deep mining, and paying them 15 to 20 per cent. in excess of the price necessary to perform the same work by hand labour. If that does not look like business, and a desire to encourage their introduction, I am at loss to know in what terms desire and encouragement can be more forcibly expressed, unless by increasing the price to be paid for work done by boring machines. One would have thought that after so much vaunting the promoters of boring machines would be above accepting a consideration which evidently implies admitted inferiority—at least, in one important respect.

It is to be hoped, however, that they will succeed. It is by practical experimentation alone that these machines can be adapted with advantage to deep mining. As a Cornishman, though not at present, nor for some years past, an operator in the county, I am glad to see that steps are being taken to fairly test this important question. It is to the advantage of everyone connected with mining that it should be a success, and, therefore, it is difficult to see how prejudice could prevail against it, unless there were rational and clearly intelligible doubts as to its general applicability. "Kainotoman" had better subside and await results. MINER.

## NEW ORE-DRESSING INVENTIONS.

SIR,—For years past constant communications have appeared in the Journal from various correspondents with regard to the dressing of low-class ores, and inventions time after time have been advertised whereby mining was all at once to be revolutionised. First and foremost Mr. Doble, under the auspices of Mr. Barnard, was to be the revolutionary agent in this field of discovery, afterwards Mr. Barnard cast Mr. Doble into the shade, then Mr. Barnard and Dr. Emmens joined their inventions, and the process was to be nothing short of perfection. During the tiresome and enormously expensive trials of these processes the practical mine agent has been held up as a very dull kind of an individual, and according to a Liskeard correspondent the said mine agent will have to give way to a new race of beings, who are to perform wonders in the mining world. This kind of thing having continued so long the mine agent has now a right to ask for some sort of proof of this much-vaunted success. What, for instance, has been the amount of capital expended in the different trials? What have been the returns? and what has been the amount of the guaranteed profits paid to the shareholders? With regard to the New Consols (concerning which and the Nascent process a whole volume of letters might be collected), it will doubtless be remembered that years ago the mine was represented by a Truro correspondent to be as rich for tin as Dolcoath, and the very burrows were said by another correspondent to be teeming with silver; it is, consequently, something of a puzzle to practical men what particular occasion there should be for any very wonderful process of dressing taking some five years or more to get into a regular state of working. OBSERVER.

*July* 11.

## SOUTH WHEAL CROFTY MINE.

SIR,—I have often noticed complaints against the agents of mines for withholding reports of the progress of operations from the Journal, which is the recognised medium of conveying information to the mining community. I should like to be informed in the next number what reason there can be for withholding from the adventurers such information, as it is a long time from one account to the other before we can learn anything of the prospects of the mine. How are the adventurers to know what is doing, and what inducement is there to invest one's capital in the Cornish mines under such circumstances? It is considered most detrimental to mining to keep the shareholders and the public in the dark. I submit it is the duty of every manager of a mine to report as often as practicable to his employers the progress of operations, and I trust that at the next meeting of the adventurers of this mine a point will be made of it. In progressive mines, more especially, the information referred to ought to be furnished to the adventurers, and the *Mining Journal* is recognised as the best authority for that purpose.

A SHAREHOLDER.

## MINING IN BREAGE.

SIR,—In looking through the Supplement of your valuable Journal of the 8th instant I saw a letter headed "The Breage District," which, of course, I read. It speaks chiefly of Polrose Tin Mine, which I have known since I was a little boy—in 1817. In the year 1816 my late father and a large number of his neighbours, most of whom were poor men, worked this mine for a short period, draining it by a small steam-engine which had been a steam whim-engine at old Trevenen Mine, in Wendron. They sunk the shaft a few fathoms, down, I think to the 20 under the adit. They had worked it only a short time before they returned 300*l.* worth of tin, which they sold at Treloweth Smelting House. The tin was returned (made marketable) at Ruth Dower stamps (commonly called Rowas). Many of the persons who took up shares ought not to have done so, because it was absurd to expect that a young mine would be self-supporting at once, but it would appear that those poor men entertained such a notion, for when a call was made they were unable to respond to it, so that in the year 1817, with good prospects in view, operations ceased. My father was purser, and held about a quarter of the shares, which cost him about 300*l.* The agent was Capt. S. Adams, of Trenear, long since deceased. My late brother, who knew that the prospects warranted a further trial, was very desirous to see the mine re-worked, and about 10 or 12 years ago I applied to the lord's agent for a license that I might form a company for that purpose. The answer to my application was such as to stop further negociation. I remember that one of the conditions was 100*l.* minimum rent.

There are several lodes in the sett, two only of which I remember—the engine-lode, and a lode to the north of same called Margaret's lode. The company did nothing on the last-named lode, but intended to try it if capital had been forthcoming. It is a long time since I visited the mine, but the letter referred to in your last Supplement, and signed "R. T.," gives me a hope that "perseverance will be rewarded," and justify the propriety of my brother's confidence, so long ago entertained, in the paying character of the enterprize. When "R. T." writes again perhaps he will kindly say from which lode, or lodes, the 6 or 7 tons of tin—four weeks' proceeds—were derived.

A few reminesences of mining in Breage may not be uninteresting to some of your readers. It was about the year 1800 or 1801 that Godolphin Mine was originated by the discovery of a rich copper lode made by men in streaming for tin. The men did not know grey copper ore. They showed a specimen to the late Capt. J. Pearce, an agent under the late Mr. Williams, of Scorrier, who at once obtained a grant from the Duke of Leeds, and opened the mine, which in about eight years yielded a profit of about 90,000*l.* The mine was left by them very poor: but a London party, under Capt. J. Lyle, resumed the working about 1835, and left off after several years with a loss of about 150,000*l.*! Great Work Mine was worked to profit by the late Capt. J. Phillips, of Godolphin, who died about 70 years ago. He farmed the estate as well as the mine. He was evidently a very wordly man, for my father, who knew him well, told me that when on his death bed he said—"What a shame it is that just when a man has learned how to live he must die!"

How long Great Work was idle I cannot say, but it was so up to the year 1825, when it was resumed by Messrs. Grylls, Silvester and Co., of Helston, who worked it till it came into the hands of Capt. W. Teague, the present owner, who, I believe, worked it above the adit only. In that period of nearly 50 years the company made a small profit. Mr. Carter, the clerk, was there all that time. The southern part of the sett, called Wheal Breage, was working in 1816, and continued so till the whole was taken up by Messrs. Grylls and Co., in 1825.

Wheal Vor (now called Great Wheal Vor) is a very old mine, for in 1748 a pumping-engine (said to be the first erected in Cornwall) was erected here. No doubt the mines had been idle many years when the late Messrs. Gundry, of Goldsithney, took it in hand about the year 1813. They erected an engine of about 40-in. cylinder on the old shaft, and soon discovered a rich lode, but they having been borrowing money, and issuing 1*l.* notes to carry on their various works, were in the power of creditors, who made them bankrupts in 1819. Mr. H. M Grylls, one of the assignees, having illegally purchased Gundry's interest, a Chancery suit, instituted by the family, followed, which was not concluded for 30 years! The mine in that time made a profit of 272,000*l.*, but no advantage came to the Gundry family, for all their portion was swallowed up in law costs. During the working of the mine numerous additional setts being added made Wheal Vor the most extensive concern at that time in Cornwall. Polladras Downs, Penhale, Wheal Cruett (not worked by them, but afterwards called Wheal Wallas), Poldown, Carnmeal, Carleen, Wheal Vreah, Wheal Metal, and Wheal Sithney were all at work under one management. Polrose was included but not worked, nor was Spernon. The company about the year 1825 erected tin smelting works on the mine. The yield of tin was about 11,000*l.* per month, and the costs were about 6000*l.* per month. Polladras was first stopped, then, I think, Wheal Sithney, afterwards Carleen, and in 1845 the remainder. In 1851 a new company

was formed in London, which still exists. They re-opened the old mine (Wheal Vor and Wheal Vreah), and after working a few years lost 250,000*l.*, notwithstanding the profit derived from the Wheal Metal portion of the property. I regret that the company are at present not more successful in their present very limited operations at Wheal Metal.

Great Wheal Fortune (worked in 1827 under the name of Wheal Fortune) was, like many mines, a great deceiver, and, like some ladies, very fickle. Prospects sometimes good, but never realised. Mr. James Michell, late innkeeper and 'auctioneer, of Littlebeside, Gwennap, was the purser in 1827, &c. He lost 1300*l.* in the mine, and subsequent workers have lost severely. The mine is idle, and should remain so. Sithney and Carnmeal, adjacent, should also remain in *statu quo*. Penhale was tried too long. Polladras would pay better, I think, than any other mine in the parish now idle. It was self-supporting with tin 'at 40*l.* per ton, but Wheal Vor old party abandoned it because there was no profit on the working. At the present price of tin no idle mine in the parish should be re-opened. Such is my judgment.—*Truro, July* 12. R. SYMONS.

## WEST TANKERVILLE MINING COMPANY.

SIR,—In your report of the West Tankerville meeting, held last week, there are two statements which are not correct, and which I must ask you to notice in your next publication. The writer, in reply to questions, said he thought the returns would gradually progress; and he hoped in six months to see them up to 50 tons—not 60, as stated in your report. He also said he felt convinced that West Tankerville would become one of the great mines of the district—not the greatest. It is not right to allow misstatements to go out to the shareholders, hence my troubling you in the matter.

*Shrewsbury, July* 13. ARTHUR WATERS.

## CARDIGANSHIRE MINES, NEW AND OLD—No. IX.

SIR,—Having in my last two letters treated of mines undergoing liquidation, it is a matter for congratulation to find that the necessary capital is being raised to purchase and develope one of them—the Bwlch Consols Mine. I have no doubt I shall be right in predicting that not many months will pass over our heads before lasting and good discoveries of ore will be made, and the property become very valuable and profitable, and that this would be the case with Bwadrain, if capital were raised as suggested in my last, there is every reason to believe. We have reason to be thankful that the mines in this county through the very depressed period of mining we have passed and are now passing, taken as a whole, have not only held their own, but there is a decided improvement in the prospects of both old and new mines in the county, and I do not, for one, despair of yet seeing the mines of Cardiganshire looking and doing better than they have ever yet done.

If a few selections were made for trial judiciously, and the money expended in opening fresh ground, a few months only would be necessary to accomplish this very desirable object. Adit levels could be extended on the very best and most productive lodes ever worked on in the county, so as to soon gain from 100 to 150 fms. of backs, with many hundreds of fathoms with the same height, which could not fail to open mines that would last for centuries. We have neither to go deep nor to erect expensive machinery to explore these new trials, as in every instance yet proved the ore makes close to the surface, and water machinery can be brought to bear upon them in almost every instance.

For some time past the mines of this county, through various reasons, have been somewhat neglected. One reason was the opening of the Van to the east of us—an unprecedentedly rich mine. This, as is always the case, attracted great attention and capital to that immediate district, and, as a matter of course, had the effect above described, but as these mines have had a fair trial (many of them, at least) the silver tail is lost, and we shall again see more attention paid to this very rich district as sure as rivers run into the sea.—*Goginan, Aberystwith, July* 10. ABSALOM FRANCIS.

## BRITISH LEAD MINING.

SIR,—In a previous letter I pointed out the eligibility of investment in lead mines, as offering more hopeful prospects than any other, and I intimated my desire, with your permission, to continue the subject in another communication. In my last letter I showed that we consume much more lead than we produce, and are, therefore, large importers; whereas the lead-bearing districts of the United Kingdom would produce all we want as well as the amount now usually exported. The Board of Trade returns for last month are now before the public, and from them we learn that our imports continue to increase, the quantity for May, 1875, having been 5284 tons, and the value 117,998*l.*, while for last month the quantity was 6015 tons, and the value 131,752*l.* During the past month, just as during the present year, the past year, and for a long time previously, we exported none of our lead imports, while in all other metals, whether produced in the British Isles or not, there are large re-exports, as they are termed. We consumed all the lead we got.

British lead from its quality must always find a market abroad if the price be reasonable. During May we exported rolled, sheet, piping, and tubing 4163 tons, against only 2906 tons in May 12 months, and the comparative values were 22,724*l.* and 46,878*l.* respectively. The increase in value this year over that of the corresponding period last year exceeded 40 per cent. When we recollect the almost unprecedented depression of trade, without either a war or a financial panic, such figures are very encouraging to the British lead miner, whether capitalist or worker. The trade in this metal with the United States has not resumed its activity, but there was a value of 111*l.* last month against *nil* that month 12 months. The lead trade with Russia and China, which used to be of so much importance, fell away in a singular manner during some time past, but last month shows a striking revival. The value for Russia was 43,708*l.*, against 4079*l.* the May before. To China it was 11,893*l.*, against 5589*l.* in May, 1875. To Germany there was sent nearly 40 per cent. more. Australia alone shows a falling off, for which it is difficult to account, except by the heavy renewal of stock last year.

The condition of our commerce in lead is all the more satisfactory, as there has been some diminution in our exports of all departments of the metal trade, whether in the produce of our own mines or in the "re-export" of imported metals not found in this country, or also produced here as well as abroad. Lead stands prominently out as the one metal of increasing commercial importance amidst the general depression from diminished trade. The grand question for the future in connection with lead is the area of ore-bearing country opened up to the miner's pick, for there are extensive districts in Shropshire, Wales, and Ireland, rich with this metal, where the ore is virgin ore. This is particularly the case in South Wales, especially in Cardiganshire, Flint, Merioneth, Montgomery, and Glamorgan.

It would occupy more of your valuable space than could be spared to point out the characteristics of the numerous districts where new ground could be advantageously broken up or old mines re-worked, but I will call attention to a region of Denbighshire which is rich in lead, and which is now engaging the notice and enterprise of men of intelligence and activity. This district is the parish of Llanarmon-in-Yale. A company has been formed to work a very large and rich lead deposit, called the Bodidris Mining Company. It is constituted on the Limited Liability Principle, and is under the direction of competent and conscientious men. The property extends about a mile on the course of the lodes, and comprises the old Craigiog Mine, which had been worked to a depth of 100 yards, and yielded a profit of 35,000*l.* on that working. A rapid and sustained decline in the market price of the metal, such as has rarely ever been known in the case of lead, caused the cessation of operations, which are now about to be resumed. The New Mine has been worked privately for two years past, and the discoveries which have been made are so valuable as to render an increase of capital to bring forth such important resources imperative.

In the property, as now laid open, immediate returns are ensured, which will satisfy even the most impatient investors. The lodes are parallel to those of the celebrated Minera Mines, which during a decade and a-half have returned 400 tons of lead per month, and paid dividends to the shareholders in all 583,275*l.* Among the indirect advantages connected with the site of the property is cheap and facile carriage; there is a railway immediately adjacent, and coal abounds. The price of lead ore is 15*l.* 10s. per ton, and the royalty is 1-15th. It is desirable to notice the circumstance that there is abundance of blende on the property worth 5*l.* per ton. No doubt can exist of the wealth of the whole district in this metal, as the geological formation of the "country," as the miners call the vicinity of a mine, bears unqualified evidence. The stratification is the carboniferous limestone, extending from the Talargoch Mines at the extreme north, to the Great Minera, near Wrexham, a section of the area in which all the great mines in Flintshire are found, below the same rock.

The directors have had the Bodidris property thoroughly investigated—geologically, mineralogically, and practically—by most eminent mining engineers, captains, and gentlemen skilled in geological phenomena, especially in connection with mining, and they report that there is a large body of ore in the ground, and that there is probably not a better lead-bearing property in Denbigh.

Here, Mr. Editor is a fair field for *bona fide* investors, where their money will not be plundered by dishonest foreign Governments or crafty financiers. It is to be hoped that while such properties are becoming known to the investing public enterprise in lead-mining will increase, to the advantage of all concerned.

28, *Finsbury-place, London, July* 14. JOS. J. REYNOLDS.

[For remainder of Original Correspondence, see to-day's Journal.]

## GRYLLS'S ANNUAL MINING SHEET,

FROM JUNE 30, 1875, TO JUNE 30, 1876,

CONTAINING

The quantity of copper ore sold from each mine, British and Foreign—Average price per 21 cwts., and the amount of money—The average standard, produce, and price for the year, both in Cornwall and Wales—The total amount of ore, fine copper, and money—Each company's purchase—And the particulars of copper ores sold at the Ticketings in Cornwall from June 30, 1857, to June 30, 1876.

### CORNWALL.

| Mines. | Ore (21 cwts.) | Amount. | Price. |
|---|---|---|---|
| Agar, Wheal | 40 | £ 95 2 0 | £2 7 6 |
| Ambrose Lake | 130 | 541 5 0 | 4 3 6 |
| Basset, Wheal | 787 | 5096 17 6 | 6 9 6 |
| Bedford Consols | 17 | 85 0 0 | 5 0 0 |
| Bedford United Mines | 978 | 4350 11 6 | 4 9 0 |
| Belstone Mine | 89 | 566 16 6 | 6 7 6 |
| Botallack | 530 | 5136 13 6 | 9 14 0 |
| Bottle Hill | 4 | 18 0 0 | 4 10 0 |
| Brookwood | 1280 | 5804 15 0 | 4 7 6 |
| Buller, Wheal | 6 | 27 14 0 | 4 12 6 |
| Burrow and Butson | 21 | 33 9 0 | 1 12 0 |
| Carn Brea Mines | 918 | 3738 15 0 | 4 1 6 |
| Carn Camborne | 497 | 1857 12 6 | 3 6 6 |
| Cathedral Mine | 292 | 1291 4 0 | 4 8 6 |
| Champion's Ore | 44 | 170 0 0 | 3 17 6 |
| Comford, Wheal | 13 | 59 19 6 | 4 12 6 |
| Condurrow Mine | 130 | 236 15 6 | 1 16 6 |
| Crebor, Wheal | 547 | 2559 19 6 | 4 10 0 |
| Crenver and Wheal Abraham | 4474 | 16556 5 6 | 3 14 0 |
| Devon Great Consols | 8493 | 38107 7 0 | 4 2 6 |
| Dolcoath | 21 | 97 2 6 | 4 12 6 |
| Duchy Great Consols | 68 | 186 19 6 | 2 15 0 |
| East Basset | 287 | 1313 10 6 | 5 11 0 |
| East Caradon | 1405 | 7003 13 0 | 5 12 6 |
| East Pool | 1942 | 6078 3 0 | 3 1 0 |
| East Wheal Grenville | 168 | 553 15 0 | 3 6 0 |
| Eliza, Wheal | 11 | 106 8 6 | 9 13 6 |
| Emma, Wheal | 317 | 1233 9 0 | 3 18 0 |
| Friendship, Wheal | 110 | 769 19 6 | 7 0 0 |
| Gawton Copper Mine | 898 | 2869 18 6 | 3 4 0 |
| Glasgow Caradon | 2982 | 16016 11 6 | 5 7 6 |
| Grenville, Wheal | 17 | 79 17 0 | 4 14 0 |
| Gunnislake (Clitters) | 1599 | 10595 3 0 | 6 12 6 |
| Hingston Down | 3045 | 8881 15 0 | 2 18 6 |
| James's Ore | 2 | 13 0 0 | 6 10 0 |
| Johns's Ore | 2 | 14 0 0 | 7 0 0 |
| Kitty, Wheal | 14 | 89 5 0 | 6 7 6 |
| Levant Mine | 322 | 2958 3 6 | 9 3 6 |
| Marke Valley | 4451 | 17936 19 0 | 4 0 6 |
| Mitchell's Ore | 5 | 20 17 6 | 4 3 6 |
| New Dolcoath | 12 | 64 4 0 | 5 7 0 |
| New Pembroke | 319 | 2416 1 6 | 7 11 6 |
| New Rosewarne | 131 | 809 6 6 | 6 2 0 |
| North Levant | 34 | 293 7 0 | 8 15 6 |
| North Treleigh Wood | 2 | 18 0 0 | 9 0 0 |
| North Treskerby | 68 | 366 4 6 | 5 7 6 |
| North Wheal Busy | 348 | 1267 17 0 | 3 13 0 |
| Pedn-an-Jrea | 13 | 104 4 6 | 8 0 6 |
| Penberthy Crofts | 32 | 138 8 0 | 4 6 6 |
| Penstruthal | 19 | 119 18 0 | 6 6 0 |
| Phillips's Ore | 5 | 18 2 6 | 3 12 6 |
| Phœnix Mines | 635 | 4289 7 6 | 6 14 6 |
| Poldice | 10 | 3 5 0 | 0 6 6 |
| Prince of Wales Mine | 249 | 917 13 0 | 3 13 6 |
| Providence Mines | 30 | 96 15 0 | 3 4 6 |
| Relistian Consols | 2 | 15 0 0 | 7 10 0 |
| Richards's Ore | 4 | 45 5 0 | 11 6 6 |
| Russell, Wheal | 1231 | 3627 17 0 | 2 19 0 |
| St. Agnes Consols | 48 | 343 14 0 | 7 3 0 |
| St. Aubyn United | 274 | 1503 18 0 | 5 10 0 |
| St. Ives Consols | 3 | 42 3 0 | 14 1 0 |
| Seton, Wheal | 6 | 19 10 0 | 3 5 0 |
| South Caradon | 5983 | 42347 3 0 | 7 1 6 |
| South Carn Brea | 305 | 2193 9 0 | 7 4 0 |
| South Polmear | 9 | 57 16 6 | 6 8 6 |
| South Roskear | 102 | 531 4 6 | 5 4 0 |
| South Tolcarne | 45 | 247 3 0 | 7 14 6 |
| South Wheal Crofty | 1693 | 6153 16 6 | 3 17 0 |
| South Wheal Frances | 19 | 58 11 0 | 3 1 6 |
| Treffry's Regulus | 23 | 265 1 6 | 11 10 6 |
| Treleigh Wood Mine | 13 | 94 5 0 | 7 5 0 |
| Unity Wood | 55 | 296 0 0 | 5 7 6 |
| Verran's Ore | 50 | 12 8 0 | 0 5 0 |
| West Basset | 866 | 3305 3 0 | 3 16 6 |
| West of England | 22 | 132 0 0 | 6 0 0 |
| West Godolphin | 13 | 226 4 6 | 17 8 0 |
| West Maria and Fortescue | 1022 | 3447 3 0 | 3 7 6 |
| West Poldice | 369 | 2697 1 6 | 7 4 6 |
| West Roskear | 152 | 715 13 0 | 4 14 0 |
| West Tolgus | 3430 | 23078 9 6 | 6 14 6 |
| West Wheal Gorland | 14 | 64 1 0 | 4 11 6 |
| West Wheal Seton | 2825 | 14473 13 0 | 5 10 6 |

### WALES.

| | | | |
|---|---|---|---|
| Adivellas Ore | 43 | £ 125 15 0 | £2 18 6 |
| Algerian Ore and Precipitate | 287 | 3705 8 0 | 12 18 0 |
| Australian Ore | 230 | 2121 7 0 | 9 4 6 |
| Ballycammisk | 335 | 1967 4 6 | 5 17 6 |
| Bampfylde | 137 | 937 17 6 | 6 17 0 |
| Berehaven | 2954 | 19101 2 0 | 6 9 0 |
| Betts Cove Ore | 668 | 2949 4 0 | 4 8 6 |
| Burnt Ore | 29 | 36 5 0 | 1 5 0 |
| Cape Ore | 12332 | 290342 4 0 | 23 11 0 |
| Carraccio Ore | 169 | 1291 2 6 | 11 17 0 |
| Cloncurry Ore | 18 | 645 8 0 | 35 17 0 |
| Concordia Ore | 110 | 1718 19 0 | 15 12 6 |
| Copper Matt | 60 | 226 13 0 | 3 15 6 |
| Copper Ore | 461 | 3269 12 0 | 7 2 0 |
| Copper Ore Dust | 16 | 191 13 6 | 11 19 6 |
| Copper Precipitate | 69 | 3705 10 6 | 53 14 0 |
| Copper Regulus | 241 | 1843 17 6 | 8 7 0 |
| Copper Scraps | 1 | 64 4 0 | 64 4 0 |
| Copper Slag | 22 | 168 10 0 | 7 13 0 |
| Copper Sludge | 6 | 102 6 0 | 17 1 0 |
| Cronebane Ore | 723 | 1181 18 6 | 1 12 6 |
| Cuba Ore and Precipitate | 75 | 2332 10 6 | 31 2 0 |
| Del Soto | 186 | 3347 4 0 | 18 0 0 |
| Furnace Bottoms | 10 | 119 0 0 | 11 18 0 |
| Hyne's Ore | 8 | 68 8 0 | 8 6 0 |
| Italian Ore and Precipitate | 84 | 1491 9 0 | 17 15 0 |
| Knockmahon | 2334 | 13195 17 6 | 5 11 6 |
| La que lo Abarca | 50 | 526 5 0 | 10 10 6 |
| Lisbon Ore | 54 | 197 16 0 | 3 13 6 |
| Mexican Ore | 295 | 2675 5 6 | 13 1 0 |
| Moonta Ore | 726 | 1324 14 6 | 18 5 6 |
| Portuguese Ore | 62 | 713 6 0 | 11 10 0 |
| Rosebrin Ore | 27 | 158 11 0 | 5 17 6 |
| St. Josephburg's Ore | 14 | 220 1 6 | 15 14 6 |
| Swedish Ore | 168 | 554 17 6 | 3 7 0 |
| Sweepings | 6 | 33 13 6 | 5 12 6 |
| Tarrybwich | 25 | 393 18 0 | 15 15 0 |
| Tigrony | 66 | 1949 18 0 | 29 8 0 |
| Union Ore | 1572 | 10804 4 6 | 6 15 0 |
| Var Ore | 184 | 1976 4 0 | 12 1 0 |
| West Canada Ore | 185 | 2371 17 6 | 14 7 6 |
| White Metal | 10 | 99 0 0 | 9 18 0 |
| Yelta Ore | 198 | 1337 13 0 | 6 15 0 |

*Copper Ores sold in Cornwall, from June 30, 1875, to June 30, 1876:*

| | | | |
|---|---|---|---|
| Copper ores | 57,173 (21 cwts.) | Average produce | 6¼ |
| Fine copper | 3835 tons 16 cwts. | Average standard | £113 8 0 |
| Amount of money | £ 277,630 18 6 | Average price | 4 17 0 |

Compared with the previous year,

Copper ores—increase ... 9317 (21 cwts.) | Fine copper—increase. 464 tons 10 cwts.

Amount of money—increase ..... £38,471 4s. 6d.

*Copper Ores sold in Wales, from June 30, 1875, to June 30, 1876:*

| | | | |
|---|---|---|---|
| Copper ores | 25,068 (21 cwts.) | Average produce | |
| Fine copper | 4937 tons 6 cwts. | Average standard | 19¼ |
| Amount of money | £ 393,320 16 0 | Average price | £ 91 2 0 |

Compared with the previous year,

Copper ores—decrease.. 2630 (21 cwts.) | Fine copper—decrease.. 134 tons 6 cwts.

Amount of money—decrease ..... £8591 6s. 6d.

*Totals in Cornwall and Wales.*

Copper ores ..... 82,241 (21 cwts.) | Fine copper ..... 8773 tons 2 cwts.

Amount of money ..... £670,961 14s. 6d.

Compared with the previous year,

Copper ores—increase ... 6687 (21 cwts.) | Fine copper—increase. 330 tons 13 cwts.

Amount of money—increase ..... £29,879 18s. 0d.

*Copper Ores purchased by the Copper Companies from June 30, 1875, to June 30, 1876:—*

| Purchasers. | Ore (21 cwts.) | Tons copper. | Amount. |
|---|---|---|---|
| Vivian and Sons | 14,334 | 1343 0 | |
| Pascoe Grenfell and Sons | 6,431 | 820 16 | £100,934 15 |
| Nevill, Druce, and Co. | 10,843 | 1088 5 | 64,090 4 |
| Willyams, Foster, and Co. | 14,508 | 1669 10 | 82,479 5 |
| Mason and Elkington | 11,452 | 1077 2 | 127,966 9 |
| Copper Miners' Company | 7,660 | 728 13 | 82,112 12 |
| C. Lambert | 7,066 | 828 9 | 85,789 2 |
| Newton, Keates, and Co. | 130 | 10 4 | 63,427 19 |
| Sweetland, Tuttle, and Co. | 7,960 | 772 2 | 737 8 |
| British and Foreign Copper Co. | 271 | 75 9 | 58,519 11 |
| Ravenhead Copper Company | 340 | 116 3 | 5,987 0 |
| Capper Pass and Son | 751 | 142 11 | 9,184 6 |
| W. Roberts, Jun. | 132 | 39 5 | 11,752 1 |
| Landore Smelting Company | 383 | 61 13 | 3,064 14 |
| | | | 4,966 2 |

*Copper Ores sold at the Ticketings in Cornwall, from June 30, 1857, to June 30, 1876:—*

| Date. | Ore (21 cwts.) | Money. | Produce. | Standard. |
|---|---|---|---|---|
| 1857 | 193,697 | £1,276,844 12 0 | 6½ | £140 9 0 |
| 1858 | 183,292 | 1,083,728 18 6 | 6¼ | 139 6 0 |
| 1859 | 183,944 | 1,079,075 17 0 | 6¼ | 139 6 0 |
| 1860 | 180,448 | 1,079,403 4 6 | 6¼ | 139 6 0 |
| 1861 | 176,097 | 1,013,400 5 6 | 6½ | 133 18 0 |
| 1862 | 186,662 | 977,017 2 6 | 6½ | 130 1 0 |
| 1863 | 176,285 | 872,474 4 6 | 6¾ | 127 13 0 |
| 1864 | 166,707 | 858,586 1 0 | 6¼ | 139 9 0 |
| 1865 | 164,940 | 806,833 10 0 | 6¼ | 124 17 0 |
| 1866 | 148,777 | 678,641 3 0 | 6⅞ | 125 3 0 |
| 1867 | 125,679 | 547,689 8 6 | 6⅞ | 118 7 0 |
| 1868 | 121,815 | 554,029 19 0 | 6⅞ | 107 1 0 |
| 1869 | 103,199 | 430,749 10 6 | 6¾ | 110 15 0 |
| 1870 | 90,227 | 374,612 0 6 | 7 | 103 3 0 |
| 1871 | 74,367 | 292,122 4 6 | 6¾ | 98 12 0 |
| 1872 | 67,543 | 316,213 1 9 | 6½ | 99 11 0 |
| 1873 | 61,715 | 271,036 10 0 | 6½ | 114 17 0 |
| 1874 | 51,327 | 218,218 8 6 | 7¼ | 110 5 0 |
| 1875 | 47,856 | 239,159 14 0 | 7 | 97 16 0 |
| 1876 | 57,173 | 277,630 18 6 | 6¼ | 113 8 0 |

## FOREIGN MINING AND METALLURGY.

It is stated that the Administration of the Belgian State Railways will let in August a fresh contract for coal of some importance. The Administration desires to profit from present low rates, as it expects that prices will advance on the approach of winter. The state of affairs is still generally very quiet in the Belgian basins. During May, as appears from an official return just issued, Belgium received from abroad 60,000 tons of coal in round figures, against 56,000 tons imported in the corresponding period of 1875, and 22,000 tons imported in the corresponding period of 1874. In the first five months of this year the aggregate imports of coal into Belgium were 297,000 tons, against 275,000 tons in the corresponding period of 1875, and 138,000 tons in the corresponding period of 1874. England, which sent 70,000 tons of coal to Belgium in the first five months of 1874, forwarded 152,000 tons in the corresponding period of 1876, showing an increase of more than 100 per cent. in two years. The exports of coal from Belgium in the first five months of this year are officially returned at 1,400,000 tons, as compared with 1,500,000 tons in the corresponding period of 1875, and 1,300,000 tons in the corresponding period of 1874.

The canals are now generally closed in France, in accordance with the course usually adopted as the summer advances; supplies have, accordingly, to be delivered by railway, but there are no apprehensions of any inconvenient accumulation of traffic. It is probable that stocks will go on increasing rather than otherwise, and that to secure their ready disposal certain concessions will be necessary in regard to prices. The sugar works have nearly finished laying in their supplies, and metallurgical industry has concluded only small contracts. The gas companies having also taken prudent precautions, the question is naturally asked, "From what quarter can any increased demand arise?" October can alone afford a conclusive answer to this enquiry.

Transactions continue comparatively rare in the French iron trade, and business has been effected with some difficulty. Certain contracts for steel rails have, however, been concluded at 10*l.* 16s. per ton—a price which is somewhat higher than that which has recently prevailed. Upon the whole, the state of affairs remains dull, and there is little or no hope of any improvement taking place for some months to come. The forgemasters of the East of France have shown some uneasiness of late upon the question of warrants, and a general meeting is to be held shortly upon the subject at Paris, the forgemasters of the Longwy group having taken the initiative. A committee will probably be appointed at this meeting to prepare a statement upon the whole question, upon which it must be said that the opinions of French industrials are at present a good deal divided. M. Adam has presented to the French Senate a bill for securing a more effective control over railway lines of local interest, more particularly lines of less than 12½ miles in length. The Council of Bridges and Roads has been occupied with a proposal for the construction of a subterranean railway about 14½ miles long at Paris; if carried out—a point of some doubt—this scheme will involve an outlay of about 5,480,000*l.* The French Railway Plant Company is paying a final dividend for 1875 6 at the rate of 1*l.* 4s. per share. The French mechanical concern, known as John Cail and Co., is also paying a dividend of 14s. 6d. per share.

A good deal of attention is being directed to measures which the Russian Government has taken for the "protection" of metallurgical industry in Russia. In future the importation of rails duty free into Russia is prohibited, and every Russian railway company is to be required to purchase in Russia itself at least half the rails required for the establishment of its lines. In order to revive the Russian iron trade, which has been rather severely tried by English competition, the Russian Government proposes to give considerable premiums to Russian forgemasters; it will also give out some important orders for terms of three and five years. German industrials have shown a disposition to urge the adoption of a similar protective policy upon the German Government. Belgian ironmasters have witnessed the triumph of protectionist ideas in Russia with great regret, as every week there appears to be an increase in the depression prevailing in the Belgian metallurgical districts. As an illustration of the depression thus generally complained of, it may be stated that the Acoz Forges Company has just blown out one of its blast-furnaces. The Acoz Company has just secured, however, a contract for 300 tons of iron rails for the Rhenish Netherlands Railway; the price at which the contract has been taken is 6*l.* 0s. 10d. per ton, delivered at the works. Messrs. Bolckow, Vaughan, and Co. (Limited) tendered at a slightly lower price, but the contract, nevertheless, remained with the Acoz Company. The Luxembourg is said to have been offering pig recently in Belgium at the extremely low price of 2*l.* 1s. 8d. per ton; a more common and averge price is 2*l.* 2s. 6d. per ton. It appears from official returns that in the first five months of this year the Grand Duchy of Luxembourg supplied Belgium with 245,000 tons of minerals, while in the corresponding periods of the two preceding years scarcely any minerals were obtained from this source. The total imports of minerals into Belgium in the first five months of this year exhibit, nevertheless, a falling off of nearly 100,000 tons, as compared with the imports in the corresponding period of 1875, although they have attained about the same importance as in the corresponding period of 1874. The imports of rough pig into Belgium in the first five months of

this year amounted to 83,000 tons, as compared with 56,000 tons in each of the corresponding periods of the two preceding years. Other descriptions of iron-rails, wire, chains, anchors, &c., were imported into Belgium in the first five months of this year to the extent of 5000 tons in round figures, as compared with 7000 tons in the corresponding period of 1875, and 15,000 tons in the corresponding period of 1874. The exports of minerals from Belgium amounted in the first five months of this year to 56,000 tons, against 71,000 tons in the corresponding period of 1875, and 28,000 tons in the corresponding period of 1874. The exports of rough pig from Belgium have slightly declined this year. The Cuidad Real and Badajoz Railway Company will let a contract for 800 tons of rails next week.

On June 22 the Russian Customs receipts since the beginning of the year amounted to 2,662,459*l.*, showing a diminution of 181,985*l.* against the return for the corresponding part of last year, and an increase of 10,284*l.* against 1874. The imports of the precious metals amounted to 189,273*l.*, being 207,563*l.* less than in 1875, and 205,984*l.* less than in 1874. The exports of the precious metals amounted to 6,744,046*l.*, being 5,524,368*l.* more than in 1874.

Chilian copper in bars has made 80*l.* per ton at Paris; ditto ordinary description, 78*l.* per ton; ditto in ingots, 81*l.* per ton; English tough cake, 81*l.* per ton, and pure Corocoro minerals 81*l.* per ton At Rotterdam, Drontheim has been quoted at 50 fls. to 52 fls. The Dutch tin markets have been firm. but transactions have remained restricted. The Dutch Society of Commerce will hold one of its periodical sales on July 26; this sale will comprise 29,900 ingots of Banca, of which 21,900 ingots are warehoused at Amsterdam and 8000 ingots at Rotterdam. At Paris, Banca, delivered at Havre or Paris, has made 82*l.* 8s.; Straits ditto, 78*l.* 12s. per ton; and English, delivered at Havre or Rouen, 80*l.* per ton. The lead markets have been generally very quiet. At Paris, French lead, delivered at Paris, has made 21*l.* 2s.; Spanish ditto. delivered at Havre, 21*l.*; and English, ditto, 21*l.* per ton. At Rotterdam, Stolberg has made 13¼ fls, Zinc has shown little animation. Silesian delivered at Havre, has made 24*l.* 4s. per ton at Paris; and other good marks, delivered at Havre or Paris, 24*l.* per ton. Rolled Vieille-Montagne zinc has realised 32*l.* per ton at Paris.

A report on the present condition of the iron industry in Westphalia has just been issued by the Duisburg Chamber of Commerce, in response to a request from the Prussian Minister of Commerce for quarterly reports on the subject. The report states that the difficulty of keeping employed even the reduced producing power continues to increase, and the entire out-turn can only be marketed at prices which do not cover first cost. Important furnaces have been blown out, and the stoppage of others is contemplated. A comparison of prices with those ruling in 1868 shows that while coal prices are still about 25 per cent. higher, those of puddled iron are about 10 per cent. lower than in the year referred to. In favourable instances the prices obtained cover the cash outlay in materials and wages and a portion of the interest on the invested capital, leaving nothing for the depreciation account, repairs, &c., so that actual loss is the result of working. In the foundries of the Lower Rhine districts, which in former years marketed with ease an average monthly supply of about 350,000 kilos. only about 84,000 kilos. per month are now produced. In the rolling and machine works affairs are in a correspondingly unfavourable condition.

# Meetings of Public Companies.

## CONDES COMPANY OF CHILI.

A meeting of shareholders was held on Wednesday, at the offices of the company, London Wall,—Mr. LLOYD FOSTER in the chair.

The CHAIRMAN said the meeting was called in accordance with the arrangement that was made at the last meeting of the company, when the directors undertook that Mr. Phillips, the gentlemen from whom the property was bought, should meet the shareholders before his return to Chili, in order to enable them to put any questions to him, and get any information they wished to have. Since that occurred Mr. Phillips had come over, and was now present at the meeting. At the last meeting he had stated that something under 300 tons of mineral was on the road. The whole of that had arrived, and the first half of it had been sold, realising an average of 16*l.* 3s. The second lot would be sold in due course—almost immediately. The general information received by the board had been given to the shareholders in the fullest possible manner, so there was very little for him to say. The property was handed over to them on Jan. 28, and they commenced working on Feb. 5 only. The contracts under which the labourers were engaged ceased on March 31. It was not the weather forced them to stop. The idea of the directors was that the best course for the company to adopt would be to smelt out there, which would save a great deal of carriage. It might be necessary for them to send some of the stuff over to England in the form of the mineral, like those 300 tons, but they considered that it would be very much to the interest of the shareholders to smelt the minerals out there, and to send it to England in bar lead. He wished to congratulate them on the opportunity they now had of interrogating Mr. Phillips, and he hoped that gentlemen present would ventilate their ideas in the fullest possible manner. Every information would be afforded by the board, and he had to congratulate the shareholders on having a very valuable property, as proved by what had been done. In three months they had delivered 300 tons in this country, and had got between 500 and 1000 tons of good ore of a similar quality on the surface ready to deliver. With these remarks he would introduce Mr. Philips to the meeting, and ask him to make a short statement, and to reply to any questions the shareholders would wish to put. (Hear, hear.)

Mr. PHILLIPS said:—With your permission I will address a few words to the shareholders present, whom I am glad to have had an opportunity of meeting for the first time, and it is very gratifying to me, as the vendor of the property, to be able to do so under such favourable circumstances, as I believe that you are all now perfectly convinced that the property I sold to the company was considerably underated by me, as compared with the reports of the two engineers sent out to examine the same. The first of them—Mr. Noah Coward—gave his report and recommendation of purchase after a very careful examination of the property, and such report coming from such an intelligent miner, so honourable and truthful an observer as Mr. Coward, would have been a convincing proof of the importance of the property. I have the highest opinion of Mr. Coward's competency and honour, and sincerely congratulate the directors of the Argentine Gold Company in having made so good a selection, as I am persuaded that what Mr. Coward offers to do will be far short of what he will succeed in doing, and he is the last man in the world to promise what he could not perform. I also have to congratulate our directors for the equally eligible selection they have made in Capt. Seccombe, who I had the pleasure of seeing a few days prior to my leaving Chili, and I believe there is but little doubt that he will be able to make the Condes Company one of the most successful mining companies in the world. His report has also been received, and is certainly very good. As regards the value of the property there was not the least doubt. It is much to be regretted that so much delay occurred previous to the company receiving the property, as had the property been received by them in December, and not the end of January, the directors would have had the satisfaction of distributing a dividend to the shareholders. Up to the transfer of the property being made on Jan. 28 last I lost no time in re-organising the works, and although there was not sufficient time to arrange for the working of the mines through the winter as we shall in future do, I succeeded in extracting upwards of 1100 tons of ore from the mine in two months operations. Only a small portion of this ore has come to England. Previous to the shipment of this ore I had already made up my mind that the most productive result would be smelting, and I consequently did not select the best ores for shipment, but sent a certain quantity of each class the mine produced, so as to show the directors and enable them to determine the best process to be adopted. I am glad to say that the directors have decided upon smelting the ores in Chili, and I have just returned from Swansea, having secured the services of a first-class smelter, who leaves for Chili immediately; and I hope that with activity and intelligence the directors will be able to give an astonishing dividend to the shareholders before the first six months are over. I made a very important discovery on the surface of the Isolina, some 200 yards distant from the workings. The lode is there in 3 metres of pure ore, with every probability of continuing in depth, and I believe that throughout the whole extent of our setts, which extend 5600 yards, similar discoveries will be made. The other six lodes have not been worked upon, but I have had them all assayed, and all have a very good ley in silver, lead, or copper, and I see no reason why they should not turn out as valuable as the Isolina lode—they are equally potent. A very important feature in the value of this property is the position of the mines, which is very favourable for exploration. The adit has been continued with activity, and is now advanced some 80 metres at a perpendicular depth of some 250 yards from the present workings; this adit will cut all the lodes, and should the Isolina be found to be rich when reached, as there appears to be every probability of, the importance of this property will be enormous. We hope to be able to communicate with the Isolina in three or four months. This will also facilitate the extraction and reduce the expense. As I have received all my part in shares, of which I retain, and intend to retain, all, the fluctuation in their value to me is indifferent. I have perfect faith in the success of this company, and it must be very badly managed indeed if it does not produce some 30 or 40 per cent. profit per annum. I shall be happy to answer any question that the shareholders may wish to put to me respecting this property. I cannot conclude without expressing my satisfaction at the very competent board of directors the company have. I have had an opportunity of forming my opinion, and I consider that their interests could not be in more competent hands.

Mr. HILL said that from what he had seen in the *Mining Journal* he thought they would have had a report by this time, the last report was dated April 24, and he believed it was the anticipation of the directors that they would have been in possession of a report by this time from Mr. Seccombe. Reference had been made to the erection of smelting furnaces, but he should like to know if they were in a condition to require great expenditure in this respect. In an economical point of view, and of the fact of the immense depreciation of silver, it was clearly to their interest not to send over a mixed metal here, which certainly would not command the same price as the silver separated from the baser metals. Still much would depend upon the probable outlay which would be required for putting these smelting works into proper order. He believed they had only recently come into possession of them, and were, perhaps, not very able to speak thoroughly as to their condition. Another point not referred to either by the Chairman or Mr. Phillips was the formation of a road, a matter which seemed to lie very much at the root of their success in an economical point of view, as diminishing in a very large ratio the cost of transport. Though they had met for one specific object the Chairman would not consider it out of course to give them his views upon that particular subject. He had had the pleasure and privilege of having a conversation with Mr. Phillips almost on his arrival, who impressed him on that occasion, as he had no doubt he would the shareholders present, with the idea that they had a property which, if energetically and wisely administered, must be productive of very extraordinary results. (Hear, hear.)

Mr. PHILLIPS thought it would not be advisable to make a road at present.

Mr. HILL asked if there was a probability of their being able to work during the whole of the year?——The CHAIRMAN said they were informed that there was not the slightest difficulty in working the mines all the year round. The difficulty exists in transporting the ore from the mines to the shipping port all the year round. They could only work the road for six months, whereas they could work the mines for twelve.

A SHAREHOLDER remarked that there was a good deal of difference of opinion at the last meeting as to the amount that 300 tons of ore would fetch. He would like to know what amount of profit they would receive? It was said at the first meeting that they would get 2000*l.*

The CHAIRMAN remarked that he had said so, but he did not think it would come quite up to that. If lead and silver had retained their value it would have been considerably more.——Mr. HILL said it must be remembered that on the present occasion the ore had, very wisely he thought, been sent to England by steamship at a cost, as he was informed, of 3*l.* 19s. per ton, whereas a sailing vessel could have been obtained at 37s. 6d.

Mr. BATTERS read extracts from Mr. Seccombe's report, as follows:—The ores at surface were, probably, fully up to the calculation of 550 tons, independent of the 300 tons sent to this country, and which were all raised during Mr. Phillips' management of two months. "I have taken as fair a sample of them as time would permit." Mr. Seccombe said he would have them tried at Santiago. He had done so, and said he enclosed the assays in his letter, but he had forgotton to do this. He was thoroughly satisfied with them.

Mr. BATTERS to Mr. Phillips: What would be the expense of putting the smelting furnaces in order?——Mr. PHILLIPS: The expense is the constructing of the furnaces. If 500 tons per month are worked it will require at least three or four furnaces, and the cost of each would be about 350*l.*

Mr. BATTERS: You should explain that where the smelting furnaces are you have plenty of water-power to drive any blast or machinery you require.

Mr. PHILLIPS: We have a river with a good fall within 25 yards of the furnace ground.

Mr. BATTERS: What sized river?——Mr. PHILLIPS: About 3½ yards in width, running all the year round. We shall have to use coal for smelting. We get it from the mines in Chili. The furnaces would all be put up in a month.

Mr. BATTERS asked what would be the result of bringing down a sufficient quantity of ore to smelt—say, 500 tons a month?——Mr. PHILLIPS said the result of his calculation was that it ought to leave every month 2900*l.* The second operation was selling the produce out there to the smelting establishment, who had offered to buy it all provided the company would sell all their produce for three years, and that would leave a profit of 3380*l.* a month as against 2900*l.* The third operation was for smelting in the reverberatory furnace: the capital required for that would be 6000*l.*, and that would leave a profit of 2478*l.* per month. Smelting the lead ore and sending the pure lead and silver to England would leave 6333*l.* per month. These were different operations entirely. It must be evident to the shareholders that if the mineral containing the ley of lead with a large percentage of silver can be placed in the smelting establishment, so that it would not cost more than 2*l.* 10s. a ton, the company must make a large profit, when it is borne in mind that the same ore brought to England and sold to the smelters here realise 16*l.* per ton. The ore after being smelted in Chili could be sent home in bar-lead, and should realise not far short of 100*l.* per ton. The ore did not cost them more than 2*l.* 10s. a ton put in the smelting establishment.

The CHAIRMAN remarked that their limit of production was governed by their power of carriage.

Mr. PHILLIPS said he could get 1000 mules in a week.

Mr. BATTERS said that according to Mr. Seccombe's statement the land throughout the mine was worth an average of 4 tons per lineal or mining fathom in the old workings, and in the new discovery it was worth 6 tons per fathom. He also stated that the fair price for driving the ground would be 2*l.* per fathom, so that they would raise 4 tons of ore for 2*l.* in driving the ends, and they could stope it for 10s. to 15s.

The CHAIRMAN moved a vote of thanks to Mr. Phillips for attending the meeting at considerable inconvenience to himself.

Mr. HILL seconded the resolution, and said they were very much indebted to Mr. Phillips for his kind attention on this occasion, and for the full details he had given them.

The resolution was cordially adopted, and a vote of thanks to the Chairman closed the proceedings.

## NEW GELLIVARA COMPANY.

The eighth ordinary general meeting of shareholders was held, on Thursday, at the offices of the company, Fenchurch-street,

Mr. HUGH C. SMITH in the chair.

Mr. STEAD (the secretary) read the notice calling the meeting.

The report of the directors stated that the business of the company during 1875 proceeded with regularity, but the accounts showed a heavy loss on the season's operations, caused by the general stagnation in trade during the year. A satisfactory feature in the operations was the increased output of pig and bar iron. The favourable reports from two of the leading houses in Sheffield, to whom samples of the pig iron were sent for trial, quite confirm anticipations in regard to quality, while that of a parcel of bars sent to India proved equally good. The board have, therefore, fair grounds for expecting that as soon as the present exceptional state of trade has passed away the produce of this company's estates, both wood and iron, will command a ready and remunerative sale. Meanwhile they are endeavouring by every means in their power to close the capital accounts, so as to avoid any further outlay on them. During 1875, by order of the Swedish Government, a geological survey of the Gellivara Mountain was held, and the report submitted to the Government again confirms the extraordinary richness and extent of the mineral deposits. A translation of this report is at the office, and as it is too bulky for circulation among the shareholders the directors hope that anyone wishing to read it will call at the company's offices for that purpose.

The CHAIRMAN said he regretted to have to address the shareholders this year on the subject of the very heavy loss which had resulted from the operations of the past year. There had been a good market for the company's wood, but the price had been low. The manager had been constantly recommending the board to increase the manufacture of iron. On previous occasions he had mentioned to the shareholders that large tracts of the company's land were held under concessions granted nearly 100 years ago, with certain obligations for the manufacture of iron, and some time ago there was a kind of outcry both in the country and in the Diet because the company had not manufactured iron. Partly to meet that, and partly to utilise the enormous amount of charcoal which the company possessed, the year before last the directors blew in one furnace, and last year they blew in another One parcel of bar-iron had been sent home and forwarded on to India, and the quality was pronounced to be very good. Two parcels of pig-iron were also sent on to Sheffield, and reported to be excellent. The manager had now two furnaces and several forges at work, and hoped in 1876 and 1877 to turn out nearly 1000 tons of bar-iron, and of course if the expectations were realised it would make an important difference to the company. The great difficulty with which they had to contend was the sending of the ore up from the South of Sweden; on the other hand, there was an inexhaustible supply of charcoal, and labour was cheap, so that the company would be in a pretty good position to compete with people in the southern districts. Last year the Swedish Government ordered a geological survey of the Gellivara Mountain, which was made, and a very long report was sent home, which was submitted to the Government, and fully confirmed the extraordinary reports as to the richness of the deposits. In conclusion, the Chairman moved the adoption of the report and accounts.

Mr. W. B. HAWKINS seconded the resolution.

A short discussion ensued, in the course of which a SHAREHOLDER observed that no doubt the company would have to look to their iron manufacture for a considerable portion of their future prosperity.

The report was then adopted.

The retiring directors—Mr. Hawkins and Mr. Wilson—were re-elected, and the auditors re-appointed.

A vote of thanks to the Chairman and directors closed the proceedings.

## HERODSFOOT MINE.

At a meeting of adventurers, held at the mine, on July 4 (Mr. Matthew Loam in the chair), the accounts showed a profit on the four months' working—Jan. 8 to April 29—of 4*l.* 11s. 7d., a balance of assets over liabilities of 1580*l.* 13s. 5d., and a cash balance of 761*l.* 10s. Messrs. Loam, Hawke, and Isaac were re-elected members of the committee. The following report was read:—

*July* 4.—The cross-cut at the 205 is driven nearly 13 fms., and we calculate about 5 fms. more to reach the lode. We have since the last meeting had several mishaps; our main-rod broke and caused delay, and we had water in and damages to repair. Now we are in full work again, and hope in two or three months to intersect the lode. The object is an interesting one, and when intersected will, I believe, be a productive lode. The lode in the 190 south is 2 ft. wide, and yields saving work, or say 5 cwts. lead per fathom. This level is beyond any other level in this direction, and has so lengthened and improved in quality in the 175, that we hope the next level will do some good. The stopes in the back of the 190 continue to yield about the usual quantity of lead—say from 8 to 10 cwts. of lead per fathom. I am glad to say the stopes in the back of the 80, referred to in my last report, are looking very promising, and worth 12 cwts. of lead per fathom. The lode is very spare and wet. The latter indication I think favourable of, as the shoot of lead, though not long, is whole to surface. We have managed to meet our expenses, and hope to do so for the future, till the bottom level is opened up, when I shall hope for something better than meeting cost.—THOMAS TREVILLION.

## MARKE VALLEY MINING COMPANY.

The general meeting of shareholders was held at the company's offices, Salisbury, on Wednesday,

Mr. FRANCIS G. LANE in the chair.

Mr. JOHN HARDING (the secretary) read the notice convening the meeting, and the statement of accounts, showing a cash balance of 319*l.* 7s. 5d., and assets 1694*l.* 4s. 10d., against liabilities *nil*, together with the report of the agents, of which the subjoined is an abstract, were submitted:—

Capts. Wm. George and James Stenlake reported that since the last meeting the 148 cross-cut has been driven south from Salisbury shaft 3 fms., and the ground continues hard. They now consider it advisable to put another pare of men in the cross-cut, and the shaftmen to resume the sinking of the shaft, cut top and tip plats, fix cistern, &c., before the lode is intersected, so as to let the water down to the 148. In the 136 west Marke's lode is large, with some good quality copper ore. The new shaft having been fully communicated with the rise, the water taken up in pipes, and footway put in, the men have since been engaged in clearing the accumulated stuff, which will be completed as soon as possible. Contracts have been entered into for the erection of the new engine now on the mine, and it is intended to proceed with this work at once, the cost of which will be included in next quarter's accounts. On the whole, they consider the appearances of the mine are satisfactory, for although some of the ends are not so productive as reported to the last meeting, yet they think the improvement in the 10 end since the driving was commenced, the distance it is behind the 20, where a good course of ore was driven through, and, being in whole ground to surface, are very encouraging for the future prosperity of the mine.

## BELSTONE MINING COMPANY.

The ordinary general meeting of shareholders was held on Wednesday, at the offices of the company, Royal Exchange Buildings,

Mr. JAMES WILSON, the Chairman of the company, presiding.

Mr. F. R. REEVES (the secretary) read the notice calling the meeting. The report of the directors, which was taken as read, was as follows:—

The directors, in presenting their half yearly report, regret that they are unable to announce the intersection of the main lode at the 80. The distance of the lode from the A shaft at this depth is calculated to be about 20 fms., of which 18½ fms. have been already driven, leaving only 1½ fm., or about two weeks' work, to reach the lode. The ground passed through continues to present the highly favourable indications mentioned in the last report, so that unless some extraordinary change takes place in the character of the ground in the short distance yet to be driven, the cutting of a rich lode at this depth may be looked for very shortly.

The shareholders are aware that owing to the large quantity of water to be pumped up, and the consequent strain put upon the pumping machinery, frequent breakages took place, causing great delay, and that in dry weather the water in the river was insufficient to drive the wheel fast enough to cope with the water in the shaft. These difficulties, which were referred to in the report of August last year, can be readily overcome by the erection of an additional water wheel, and strengthening and improving the pumping machinery, entailing an outlay of about 1000*l.*

It was with the view of effecting these improvements, and of paying off the mortgage debt of 1000*l.*, that the directors issued the circular letter of March 18, inviting subscriptions for debentures to the amount of 3000*l.* The 1000*l.* mortgage has since been paid off, and the necessary additions and improvements to the pumping machinery are being pushed forward at the mine as rapidly as possible. When these improvements are effected the machinery will be powerful enough to keep the mine clear of water to a considerable depth, even in the dryest season.

Notwithstanding the delays caused by the frequent breakages, the directors had hoped that the lode would have been intersected before the summer months, and consequently the erection of the wheel, &c., which would have interfered with and delayed the drivage, was put off, but in this they have been disappointed. Although only about a fortnight's drivage remains to be done to cut the lode at the 80, all operations at that depth are suspended at present until the new wheel is erected and the other alterations are completed; when this is done the drivage to the lode will be at once resumed.

The CHAIRMAN said he had not much to add to the report of the directors, except to state that he had recently been down to the mine, and had carefully examined the workings. Since the last meeting they had driven about 12 fms. towards the main lode at the 80, but during the past few weeks they had been stopped in consequence of the scarcity of water on the surface, which, consequently, did not drive the wheel fast enough to work the pumps effectually. Everything was being done to economise the power which they possessed in the shape of water on the surface by making some alterations (which would not cost much) in the pumping machinery without having to go to much expense in the purchase of new machinery. When he went down to the mine he took with him a Welsh mining engineer from Aberystwith, a man who was in no way connected with the neighbourhood, and who was, therefore, likely to be entirely independent of local influence, and likely to give genuine information; he went down the mine, and saw all the pumping arrangements, and said that he had never been down any mine which had such perfect pumping arrangements underground, and that the whole of the work below the surface (much of which was very difficult indeed) was of a perfect character, and he had never seen anything better. The only thing was that the wheel which drove the pumping machinery, after working several years, had arrived at the stage that it ought to be replaced, and if that were done and some other alterations carried out there would be power enough at all times to drive the pumps. The company had been offered machinery from a large mine, and if they could sell the old wheel and put up a new one it would be all that was required, and it would be done at a moderately cheap rate. They were now getting out ore of good quality, averaging about 13½ per cent. This was from the upper level, as the water had prevented them from getting into the 80. The directors hoped, when the weather changed and became favourable, to reach the lode in two or three weeks time. With regard to the debentures which were issued a short time ago, for two purposes—first, to take up the 1000*l.* of mortgage which was running on the mine; next, 1000*l.* for machinery; and the rest for working expenses. He might mention that the 1000*l.* of mortgage had been paid off, so that the mine was perfectly free, and was the property of the shareholders, and there was no lien upon it, except the debentures, but if the directors wished to order the machinery to which he had referred he thought they were not in a position to do so, because the shareholders had not taken up the debentures to the extent which was expected, although they had been fixed at as small a sum as possible. There had been 2100*l.* taken up, out of which he had taken 200*l.*, and the other directors had also taken their due proportion; and he had promised that he would take another 300*l.*, but he certainly should not do so unless the shareholders also came forward and subscribed, and made the amount up to 3000*l.* Looking at the excellent security which was offered, it was surprising that the full amount of 3000*l.* had not been subscribed for at once; there was no doubt the property represented the value ten times over. He hoped that before they met again the lode would have been cut into, and that the mine would

be a great success. If the shareholders desired any further information his son, who had been at the mine, and was thoroughly acquainted with all the workings, would be happy to give it. He moved the adoption of the report.

Mr. MARTINEAU seconded the resolution.

Mr. PEARCE asked how many fathoms they had to drive before reaching the main lode in the 80 fm. level.——Mr. WILSON, jun., said they had about 1½ fm. to drive.

The report was then adopted.

A vote of thanks to the Chairman closed the proceedings.

## GROGWINION LEAD MINING COMPANY.

**The report to be presented at the forthcoming meeting states that the prediction of the directors has been fulfilled; the monthly sales are now 100 tons, but the pecuniary benefit of the increased sales will not be fully apparent until the close of the current half-year. The directors recommend a dividend of 2s. 6d. per share, leaving 157*l*. 2s. to be carried forward. Arrangements as to rent of dressing-floors have not yet been concluded, but the directors hope that the difficulties may yet be overcome in a manner satisfactory both to the freeholders and the company.**

Capt. John Kitto reports that their prospects during the past half-year have continued steadily and satisfactorily to improve, and at no period in the mine's history were they better or more encouraging for the future than at the present time. Steady progress has been made in the development of the mine since the last meeting of the shareholders. Every part of the underground workings is thoroughly well ventilated, a large quantity of productive ground has been opened out and is now available for stopes, and increased returns have already been the result; and, judging from present prospects, he has no hesitation in saying that they have a very prosperous future in store. They have cleared and repaired the deep adit level on No. 1 lode sufficiently far to enable them to get up into an old level from 18 to 20 fms. above, and known as the "long drift;" and, from the comparatively small trials that they have already made, it would appear that this old level has been driven on a false vein, and not on the main lode. They have already discovered and broken some excellent samples of ore, and the prospects of soon having a rich lode are most favourable, but he will be able to say more about this in the course of another month. They have further extended and improved the dressing machinery, and everything is in excellent working order, and with the addition of another round buddle they will be in a position to dress at least 150 tons per month. The present sales are 100 tons monthly; but, judging from prospects now presented, he believes the time is not far distant when they will be further increased.

## EAST POOL MINING COMPANY.

A two-monthly meeting of adventurers was held at the mine, on Tuesday, Mr. R. R. BROAD, of Falmouth, presiding. From the accounts it appeared that the labour costs for January amounted to 1621*l*. 9s. 8d., and for February 1569*l*. 8s.; the merchants' bills were 1219*l*. 9s. 8d.; transfer on account of the thirteenth month, 350*l*.; and dues, 327*l*. 14s. 4d.: making a total of 5088*l*. 1s. 8d. The receipts were ——For copper, 1085*l*. 4s.; for tin, 2361*l*. 19s. 9d.; tinstone, 1690*l*. 5s. 8d.; arsenic, 450*l*.; wolfram, 3*l*. 13s. 6d.; one or two other smaller items making up the total credits to 5700*l*. 8s., and leaving a profit on the two months' working of 612*l*. 6s. 4d. A balance of 61*l*. 9s. 5d. was brought forward from the last account, thus making the sum available for dividend 673*l*. 15s. 9d. Out of this a dividend of 2s. per share was declared, absorbing 640*l*., and 33*l*. 15s. 5d. was carried forward to the credit of next account. The following report was read:—

*July* 10.—Great Lode: At the 180, during the last two months we have driven east about 3 fms.; the lode is 2 fms. wide, and is worth for tin 20*l*. per fathom. The 180 is driven west of cross-course 15 fms., and is worth for tin 12*l*. per fathom. We have five stopes working in the back of the 180—three east, worth for tin 18*l*. per fathom each stope; also two west, worth 10*l*. per fathom each stope. The cross-cut at this level is driven 16 fms. south to intersect the engine and south lodes. The sump-winze sinking below the 180 is down 5½ fms.; the shaft being completed through the gunnies, there is a lift set to work in this winze, and is working very well; the lode in the winze is worth for tin 18*l*. per fathom. In the 170 we have one stope working in the back of the level, and is worth for tin 10*l*. per fathom. We have a stope working in bottom of the 160, on the eastern ground, worth for tin 12*l*. per fathom.—Engine Lode: At the 170 we have driven west on a caunter lode 7 fms., which is worth for tin about 6*l*. per fathom. At the 160 we have two stopes working in the back of this level, worth for tin 14*l*. per fathom for tin.—South Lode: The 160 is driven east of long winze 30 fms., and is worth for tin 18*l*. per fathom. There is a winze sinking below this level, and is worth for tin 14*l*. per fathom. The 150 is driven east of eastern cross-course about 20 fms., and is worth for tin and copper 8*l*. per fathom. The 150 is driven east of long winze 22 fms., and is worth for tin and copper 15*l*. per fathom. The winze in the bottom of this level is communicated to the 160 during the past month. There are eight stopes working in the back and bottom of the 150, worth on an average for tin and copper 12*l*. per fathom each stope. The 120 is driven east 22 fms., and is worth for tin and copper 1*l*. per fathom. All the ends and stopes are valued at the cubic fathom.—JOHN MAYNARD (manager), CHARLES BISHOP, WM. TIPPET (agents).

The CHAIRMAN, in moving the adoption of the report and accounts, said they only wanted a better price for tin in order to give an increased dividend.

Mr. G. MICHELL again called attention to the desirability of holding their meetings in the future every 12 weeks instead of every two months as heretofore. Many reasons could be adduced in favour of the change, and he believed it would be found to be a very great advantage. He regretted that the committee had been obliged to reduce the dividend, but the circumstances were such that they could not help themselves. There was no doubt that they had a very good mine in East Pool, but the best part of it was in the bottom, from which as yet they had had no opportudity of taking out a single grain of tin, excepting from the sump winze, which they were now sinking, and which was down about 5½ fms. Then, again, it was thought desirable that they should sink their sump shaft, and the committee would ask the approval of the adventurers to proceed with that work at once.

Mr. RULE said he had no desire to find fault with the management, but it was rumoured outside that the merchants were not paid as they ought to be, and that there was so much credit that the merchants were compelled to charge more for their materials than they otherwise would do. At Wheal Grenville the merchants were paid every month, and 5 per cent. was deducted from the bills, and he saw no reason why they should not do the same at East Pool, even though they had for the time to forego their dividend, or to overdraw the banker's account for the purpose. If they borrowed as much of 5000*l*. it would only cost them 250*l*. a year, at 5 per cent., and by paying their debts regularly they would be able to deduct that amount of percentage from the bills.

Mr. G. MICHELL quite agreed with Mr. Rule as to the importance of paying their bills more promptly than at present, but he did not think they were yet in a position to pay them monthly. He would very gladly support a motion in favour of the merchants being paid every two months. They ought not to endeavour by any means to make the merchants their bankers, but the merchants should be paid more punctually, even if they had to pay a little more interest at their bankers for it.

The PURSER: Before we attempt anything of that sort I think we ought to satisfy ourselves that we are really paying the merchants more than we ought to pay them for the goods that they are supplying. Nearly all our materials are supplied by contract, and I should like to know what mine is being supplied at a lower prices than we are. I am informed by one of the most respectable merchants in this district that we purchase our goods at something like 10 per cent. below most other mines in the neighbourhood, and if that be so I think it shows that the merchants are contented to go on in the same course that they have hitherto been pursuing. If the mine was in a better financial position we could meet our liabilities in a more satisfactory way than at present, but you must remember that the operations of this mine are very extensive, and that we have a large amount of capital employed; and, under these circumstances, we are obliged to do all we possibly can in order to give the shareholders a very slight percentage upon their outlay. We take care to have everything supplied on the lowest terms, and we cannot do more than we have been doing in the interests of the mine and the adventurers at large. We all know that interested motives will prompt men to make suggestions, and you will gather from what Mr. Rule has said that there is an account owing to him, and that he would like to have it paid.

Mr. RULE said he was quite sure that under such an arrangement as he had suggested they would get their materials much cheaper. They would be able to purchase the best quality iron, delivered free upon the mine, for 9*l*. per ton, and common iron for 7*l*. 10s.; their powder they could buy for 35*l*. per ton, and first-class quality coal for 15s. 6d., all delivered free. You can buy coals from the Copper Miner's Company in Wales for 6s. 6d. per ton; the freight is about 5s. 3d.; you can get a discount, as a rule, of 2½ per cent.; the quay dues, if the coals are discharged at Penzance, are 3d., if at Hayle, 6d., and the carriage from Penzance is 2s. 8d., or from Hayle 2s. 6d.——The accounts were passed, and was unanimously resolved that all future meetings should be held every 12 weeks.

The discussion on the financial question was then resumed upon a motion by Mr. RULE, seconded by Mr. G. MICHELL, that the merchants should be paid every two months.

Capt. JAMES feared that it would be a very indiscreet thing to borrow money of their bankers to pay the merchants, otherwise he should have no objection to the proposition. He failed to see that they obtained their materials at 10 per cent. less than other mines; so far from that being the case, they were really giving more than some of the neighbouring mines. Before they decided upon making the change suggested he asked the adventurers to remember that at Tincroft and Carn Brea goods supplied in October last were not charged in the accounts until MAY, and that even then 1½ per cent. was deducted from the bills. He contended that in those cases discount was taken where the manager had no right to take it, and he had no doubt himself that another three or four months would elapse before that money would be paid. If they were going to make an alteration at East Pool let it be a thorough, and not a partial, one, and let everyone be paid in the same way.

Mr. HARRIS did not think they were in a position to make the change until the price of tin went up.

Mr. RULE: Then we shall have to wait a long time. The price of tin is not going up for some time to come, what we have to do is to endeavour to make our mines pay at present prices. Now is the time for us to put our shoulders to the wheel. I should like to know why it is that we do not tender for coals as well as for the other materials. If we are under the screw of the Portreath Company let us get out of it as soon as possible. If there was not something wrong in this matter I believe we should be importing our own coals at the present moment.

The PURSER: I think I explained that on a former occasion. The fact is that at one time when we were very heavily in debt to the Portreath Company they were very lenient towards us, and never once pressed us for the money, and it would be very ungrateful if we left them now. I may say that nothing would give me greater pleasure then to be able, if possible, to pay our accounts every month, but I can assure you that at present that is quite out of the question.

Captain JAMES remarked that if the thing was to be done at all he would rather forego the dividends than draw upon their bankers. He hated that system, although he must confess he should like to see the merchants paid every two months. He regretted to say there were mines in the county charging no less than 60*l*. per month for bankers' charges, and he was really at a loss to know how they could countenance such a thing. It was one of the greatest abuses he knew of in connection with Cornish mining, and he hoped it would not be adopted at East Pool. He, therefore, recommended the postponement of the resolution.

After some further discussion an amendment was moved by the PURSER, and seconded by Mr. HARRIS, that matters remain as at present.

When the amendment was put to the meeting only six hands were held up for it, whereupon the CHAIRMAN said it was really a very serious matter, and he should have to demand a poll if the resolution was carried.

Mr. RULE, however, rather than embarrass the committee withdrew the resolution before it was put from the chair, and the matter dropped.

Before the meeting separated, Capt. MAYNARD made a few remarks on the present position of the mine. He pointed out the necessity of sinking the sump-shaft at once, because the best of the mine was in the bottom, and said they also decided to sink the sump winze and put up a rise from the 180 to the 170, at the eastern part of the 180 fathom level, so that they would have a better opportunity of bringing away the stuff. Hitherto they had been working at a great disadvantage there.—*Western Daily Mercury.*

## CWM DWYFOR COPPER AND SILVER-LEAD MINES, CARNARVONSHIRE.

**The following is the report of Capt. Joseph Jewell, the company's agent, of the operations at these mines since the date of the last ordinary general meeting:—**

*July* 1.—I beg to hand you my report of our operations at these mines since the date of the last general meeting. I had hoped I should by this time have been able to report good sales of ore, but owing to the great delay which occurred in getting the necessary crushing machinery erected we have not as yet commenced making regular returns of ore, though I expect now to do so. I believe, however, the working of the mines, and the results obtained, and especially the indications presented as our operations attain depth, will be regarded satisfactorily. We have already sold two small parcels of lead ore, amounting to 17 tons 16 cwts., and have now at surface ready for dressing about 200 tons leadstuff, and 20 to 30 tons of copper ore.—No. 4 Lode South, Stewart's Shaft: The sinking of this shaft below the 1st is being carried on vigorously; the lode is 4 ft. wide, 3 ft. of which produres saving work for lead ore, occasionally also we meet with branches or feeders composed of carbonate of lime, iron pyrites, quartz, and rich lead ore, dropping from the south side of the shaft towards the lode, which is a very favourable indication, as has been proved to be the case, not only in these mines, but also in all the rich mines of this district. The present depth of this shaft below the 10 on this lode is 6 fm. 4 ft. 6 in.—No. 4 Level South: This level, driving east from Stewart's shaft, on the course of the No. 4 lode south, has been extended since the date of last meeting 23 fms. 5 ft. 5 in., making a total distance driven east of the south cross-cut of 35 fms. 5 in. The lode in this level for the last two months' driving has been split up and unproductive, but I am glad to say it is again presenting a much better appearance, being now 2 ft. wide, and as we are in close proximity to the large s ide observable at surface at the eastern end of the open-cut, I believe that when the intersection takes places we shall open up a fine section of ore ground (similar to that met with near the slide west of Stewart's shaft), as we have a length of over 35 fms. from the said large slide to drive this level eastward before it reaches the great cross-course; and as in driving eastward the hill rises considerably, we shall gain backs rapidly. We have also driven 7 ft. from the point of the slide, west of Stewart's shaft, in a north-west direction on a caunter branch caused by the slide; this branch will yield 10 cwts. of silver-lead ore per fathom. I intend shortly to put men to drive further on this branch, and should it continue productive back to the south cross-cut it will greatly add to our reserves of ore.

Stopes: We have stoped over the back of No. 4 lode south, west of Stewart's shaft, for 19 fms., and east of the shaft for 5 fms. 2 ft., the lode producing from 15 cwts. to 25 cwts. of silver-lead ore per fathom. In same places the lode yielded 2 tons per fathom, and in the sole of the 10 the lode appears to be richer and wider than in the roof. Owing to the large quantity of leadstuff broken, which is sufficient to keep our present dressing staff employed for four or five months, I have suspended stoping for a time.

No. 3 Lode South: The level on this lode, driving east of the south cross-cut, has been extended on the course of the lode 11 fms. 4 ft. 7 in. since the date of the last meeting, making the total distance driven east of the south cross cut 19 fms. 4ft 7 in. The lode in the present end is 2 ft. wide, and will yield fully 10 cwts. of silver-lead ore per fathom, and stones of good copper ore, a very promising lode. Judging from its present appearances I think we are on the eve of making a good discovery of mineral in this level also.

No. 4 North Lode: Hopgood's Shaft: We have communicated this shaft with our No. 4 level north on the course of the above lode. The depth of the shaft from surface to the back af the level is 9 fms. 3 ft. 4 in.; sunk since the last meeting 4 fms. 4 in.; the part of the lode which was carried was about 5 ft. wide. The lode has a very masterly appearance, and I believe will in depth be found highly productive.

No. 4 Level North: The level on the above lode has been extended 6 fms. 1 ft. 4 in. since the last meeting, making a total distance driven east of the north cross-cut of 15 fms. 1 ft 10 in. The actual size of this lode has not yet been ascertained; for the last 13 fms. driving it was found to be over 7 ft. wide. This level has been suspended for the present. The part of the lode carried yielded from 8 to 10 cwts. of silver lead ore per fathom, with stones of copper ore, iron pyrites, &c.; the lode will not, however, at present pay for stoping such hard rock, but as it is of such favourable appearance, I strongly recommend at some future day further work being done on it, believing good results will follow.

The bad ventilation we had has been effectually remedied by the communication of Hopgood's and Stewart's shafts with the 10, so that we now have ample ventilation at the 10 from three shafts.

Upper or North Copper Mine: At the Upper or North Copper Mine there has not been anything done during the past year, but from the appearance of the three metalliferous lodes discovered there, and the large pile of copper-stuff broken from these lodes, I am of opinion that if this part of the sett be worked vigorously it will be found remunerative.

Deep Adit Level: In the deep adit level nothing has been done for some time; this level is extended about 32 fms. in slate formation north towards the mine, and I calculate will continue in the same kind of rock for another 50 fms., when it will enter the mineral-bearing ground, and we shall, in driving it further, no doubt discover many more lodes not yet seen south of our south cross cut. It will, when driven, intersect the lodes about 50 fms. below our present workings. I think it more in accordance with practical mining to proceed with this deep adit as soon as the mines get self supporting, than to extend the south cross cut further, as owing to the dip of the mountain we should, in extending the south cross cut, communicate to the surface in about 15 fms. The north cross cut, however, should be extended as soon as possible, as we may by it discover more lodes, and in this direction (north) we shall be gradually gaining depth.

Surface: During the past year we have built a new good smith's and carpenter's shop, powder and dynamite magazines, laid out our ore floors, and built on the same good picking, jigging, and tye houses, to enable the dressing staff to carry on the dressing of ore without interruption during the severity of the weather. We have also built a lead house and crusher house, and erected in the latter large and powerful crushing machinery, and we have made a long culvert from the open-cut on No. 4 lode south to the wheel pit to carry off all surface water. We have also made a good incline from the terminus of the Gorseddu Junction and Portmadoc Railway up the mountain side, 766 ft. long, laid with double line of rails; built a winding-drum house on the top of the incline, and made a tramway, 680 ft. long, from the top of the incline to the ore floors.

In conclusion, I beg to say that by a careful perusal of the foregoing particulars it will at once be seen that a large amount of expensive work has been done, both at surface and underground, since the last meeting, in order to enable us to carry on a vigorous prosecution of these minee and to make regular returns, and by the Gorseddu Junction and Portmadoc Railway, which has been completed since the date of the last report, a cheap and easy means of transit from the mine has been obtained. I would beg the shareholders, however, to provide us with suitable self-acting ore-dressing machinery, which will enable us to make larger returns of ore in a much less time than can be done by the machinery we have now in use, as, from the present indications of the No. 4 lode, in the bottom of Stewart's shaft, and the appearance of No. 3 lode south, we shall, as depth is attained, meet with a rich mine. I also believe that by extending levels west from the south and north cross cuts, where we have eight well-defined lodes under a hill which rises 1000 ft. high, a good mine will also be found in that direction.—JOSEPH JEWELL.

'For remainder of Meetings see to-day's Journal.]

NEW CONSOLS.—The extension of the works, in connection with the new chemical process for separating mixed ores at this mine, is being rapidly completed. The quantity treated has hitherto been limited to 18 or 20 tons a day, in consequence of deficiency of burning power, but even from this small quantity of material a return has been made of 1400*l*. a month. The men employed underground breaking ore are only 22 in number, so that each man breaks over 60*l*. worth of ore a month. This result is an extraordinary one, and will greatly surprise most mine agents. The ore as brought to surface would be condemned by most miners as worthless, and, if treated as ores in Cornwall generally are—for one metal only—would undoubtedly be so; but as four metals are extracted from them of the aggregate value of 3*l*. per ton, or a little over, it is no longer a matter of surprise that the results should be so widely different from those usually obtained. As previously stated, these ores are arsenical mundic, copper, tin, and silver; the last to the extent of about 3 oz. to the ton of ore. On the past limited scale of working, however, enough has been proved to fully justify an increase to the plant, so as to double or treble the returns. The burning power has now been increased to 40 tons per day, and another revolving calciner is shortly to be added, together with six more of Brenton's calciners for the chlorodising process. When these are all at work it is estimated that the returns will be at least 3 000*l*. per month. The crude arsenic yields about 90 per cent. of refined, and, as the company are convinced of the importance of refining their own arsenic, works, which are nearly completed, are being provided for carrying out that object; and the increased price that will then be obtained will pay a large profit on the outlay. It is also in contemplation to smelt their own copper, which is so rich after separation from the other minerals. The mine is now becoming the centre of considerable interest, and attracts many visitors. It has recently been visited by Mr. Bolden, the steward of Mr. Basset, of Tehidy, one of whose objects was to satisfy himself as to the amount of damage that had been done to vegetation in the immediate neighbourhood of the arsenic flues and stack, and after this had been ascertained he expressed his surprise at the small amount of injury, none of which has been the result of recent operations. There is no doubt as this process becomes generally known, and its profitable results fully shown, other mines will adopt it, as in some mines in West Cornwall very large returns could be made from lode stuff that is now of no commercial value, although known to be very much beteer than the New Consols ores for copper, and in some cases for silver also.

TIN TRADE.—Those interested in the tin trade cannot fail to gather some consolation from the present statistical aspect of things. I have endeavoured to dissect a few simple facts. Messrs. Sargant and Son tell us the stock in London has diminished about 500 tons, and further movements in the same direction seem highly probable. Messrs. A. Strauss and Co. say the entire stocks in London and Holland, including all that is afloat, but excluding any shipments to America etc. London, were, on June 30, 13,761 tons, on May 31, 14,651 tons, being 850 tons less. They also tell us that the shipments from straits to London for the past six months have been 3390 tons, against the corresponding six months of 1875, 3000 tons; and the shipments from Australia for the past six months of 1876, 3000 3150 tons for the same time last year—total less shipments of about 700 tons, against deliveries of foreign tin in London for the past six months have been 6538 tons, against 5652 tons last year. In comparing these figures it will be found that in the first six months of 1875 there was shipped 1158 tons in excess of the deliveries, and in the past six months the shipments have been 428 tons less than the deliveries.—STANNUM.

FRANK MILLS.—A petition for winding-up this mine, near Exeter, has been presented to the Vice-Warden of the Stannaries by Francis Dingey, of Truro. Frank Mills is in 5000 shares, with about 5*l*. per share—25,000*l*.—paid up.

NEW FOWEY CONSOLS.—At a meeting of shareholders, it was resolved to wind up the company voluntarily, and Capt. Thomas Parkyn, of Pinsbury House, Roche, and Mr. Thomas Crapp, of St. Columb, were appointed liquidators for the purpose of winding up the affairs of the company and distributing its property.—*West Briton.*

THE MENDIP HEMATITE AND LEAD MINING COMPANY (Limited).—A petition was presented by two shareholders to the Court of Chancery praying for the usual order to wind it up. The petition stated that the company was formed on Oct. 10, 1872, as a mining and smelting company, with a nominal capital of 30,000*l*., in 30,000 shares, of 1*l*. each. Quarterly dividends were paid at the rate of 15*l*. per cent. per annum on the shares in the company from March 31, 1873, to June 30, 1874, since which time none had been paid; and no general meeting had been held or report made to the shareholders for more than a year. A Mr. Kinsman, who was now the manager and director of the Mendip Company, was when it was formed a promoter of a then existing company, called the Waldegrave Smelting Company, to which he and Mr. Bray sold some mines, plant, and machinery for 3000*l*. In August, 1872, a resolution was passed for the voluntary winding-up of the Waldegrave Company, and Mr. Kinsman was appointed the liquidator, with power to sell its property to a Mr. Maudsley for a less sum than 3000*l*. On August 31, 1872, Mr. Maudsley, who with Mr. Kinsman was then promoting the Mendip Company, re-sold to it for 18,000*l*. the Waldegrave property just purchased for less than 3000*l*. The 18,000*l*. was to be paid in shares of the Mendip Company, which company was to see that the shares were realised, and until they were, and all the 18,000*l*. paid to Mr. Maudsley, no assignment of the Waldegrave property was to be made. When the Mendip Company was formed, there was a certain quantity of ore near the surface of the land, but the mining sets had been practically exhausted, and were not worth so much as when the Waldegrave Company first bought them. Soon after the formation of the Mendip Company 12,325 of the vendors' shares were allotted to Mr. Kinsman, and about 5000 to Mr. Maudsley and others. The last-mentioned shares were afterwards sold and treated as assets of the Mendip Company; and the directors and Mr. Kinsman alleged that he was entitled to a balance of 5375*l*. in shares, or to the proceeds of such shares. A meeting of the Mendip Company was held at Bristol on Dec. 21, 1875, when it appeared from the accounts of the company that it had been carrying on its business at a loss, and that all its capital was spent. Further, no assignment of the Waldegrave property had been made, and Mr. Kinsman was in possession of the whole concern. He and Mr. Maudsley contended that they were entitled to retain the possession till the money due to them was paid to one or other of them. No more shares in the Mendip Company had been issued or applied for, and the undertaking having proved, as the petitioners believed, a mere bubble, and its affairs having got into the most inextricable state of confusion, a winding-up order was considered the only means by which, perhaps, the company might be either resuscitated or effectually wound up. Mr. Glasse, Q.C., Mr. J. Pearson, Q.C., Mr. Higgins, Q.C., Mr. Locock Webb, Q.C., Mr. Ince, Q.C., Mr. Grosvenor Woods, Mr. Macnaghten, Mr. Simmonds, Mr. Maidlow, and Mr. Locke were for the several parties. Mr. Kinsman made an affidavit in opposition to the petition, denying several of the allegations contained in it, and insisting in effect upon the efficiency of the company, against which, he said, no debts were claimed. The affidavit was read in Court. The Vice-Chancellor made the usual compulsory order to wind-up the company.

## THE ALMADA AND TIRITO CONSOLIDATED SILVER MINING COMPANY.

### DIOS PADRE AND MINA GRANDE.

F. W. Breach, May 18.—Regarding the Dios Padre, at a little less than 25 ft. west of the tunnel we cut a lode of very good ore; it is 3 ft. wide on the north side at the cross-cut, and is widening to all appearance rapidly as it goes north; the ore is grey copper and black ore with spots of green ore on the outside of the lode. A stone of the grey ore (petanque) gave 34*l*. per ton for silver and 20 per cent. copper. I have little doubt that on getting into the lode we shall find it to be all black ore, perhaps mixed with grey ore; altogether it looks very promising indeed. In the tunnel end we now have a very hard well formed wall on the east side of the level, 7 ft. from the wall we have always driven on, and going north the east wall is bending to the east, and giving room for a vein of ore that we cut last week to gradually make as we drive. Although as yet the ore is only a few inches wide, it contains spots of pitanque, and gives the hopes that it may be the southern point of the Dios Padre lode, and I think there is no doubt we are on the same wall that was worked down on from the surface. As in the old workings, only one vein of ore was worked on. I believe the ore we have found to the west is entirely new. We shall immediately drive north on this vein and continue the cross-cut, as there is still every probability of the strong west lode being ahead of us; in fact, I did not expect ore until that was cut, and it probably lays 20 or 25 ft. to the west of where we now are.—Mina Grande: The cross cut east continues in the same horse. As a reference to the plan will show that the whole lode generally goes downright, and as we have no indication that the eastern lode we are cross-cutting for has any underlay worth mentioning, I do not think we have any reason to expect to reach it in less than 100 ft. more. We are now in 34 ft. from the tunnel. In the 12 we are, I think, at the extreme south point of the ore bunch; the ore is fairly solid in the back. In the north from the rise we have no improvement. The Balvanera shaft is going down in fair ground; we are down 14 ft. below the 12.

May 25.—Dios Padre: The lode appears opening out in the tunnel end, but is not more orey than last week. In the west cross-cut we commenced to drive north this week on the lode reported in my last letter. Commencing with 3 ft. in width, and driving 4 ft. 6 in., we have now 5 ft. of lode in the end. The lode as far as we can see it is rather more inclined to be green ore than black. The black ore exists in large balls, and as we drove through one of these, when the lode was first cut, it caused me to think the whole was black ore. Assays of stones of cleaned ore have given as follows:—Petanque, $380 per ton for silver; black ore, $200 per ton for silver; green ore, $163 per ton for silver. The green stone I think perhaps contained a speck or two of petanque that was overlooked in the cleaning, as I think the ore differs very little from other green ore in the mine. It should also be borne in mind that the above stones were perfectly cleaned from gangue. As soon as we have ore enough out I will have some of the green ore cleaned in the ordinary manner for the patio, and a battery sample taken as it passes through the stamps. This is the only way to obtain an average sample.—Mina Grande: The upper stopes in the 12 are rather better than last week. We have still ore in the south end worth taking out. In this end it will be necessary to cross-cut a little to prove the ground, as we have no defined wall, and where all is disordered it is possible there may be ore yet further to the west. The east cross-cut on tunnel level is without change.

June 1.—Dios Padre: The tunnel end is now all in spar, but with only spots of ore. The lode in the west cross-cut has widened considerably, and we now have the end all in spar, as well as on the east side of the level. We are in from the cross-cut 2 ft., and as far as seen in this short distance the lode is too easy for ore. The ore is in balls of very good ore, and every few feet is interrupted by cross-heads, which change the nature of the lode. Until we get further north we cannot form any opinion as to the value of the lode. We stopped the west cross-cut this week in order to push the ends harder, and also prevent the ore getting mixed with waste. On the surface we are putting up the whim and poppet heads, the main timbers of which, on being taken down at the Balbanera shaft, were found to be attacked by the white ant, and have to be replaced, otherwise the work would have been further advanced; however, the shaft is being collared up, and everything will be roofed in and in readiness for sinking before the commencement of the rainy season, from which we shall not fear any interruption.—Mina Grande: The Balbanera shaft is now down 21 feet below the 12 in fair ground. The improvement mentioned last week in the upper stopes over the 12 continues, and we now have good hopes of the north stopes turning out well. The stopes in the south back took well, and the ore is solid for 15 ft. wide.

Telegram received July 4:—"Dios Padre Mine unsatisfactory."

Telegram received July 10:—"Dros Padre Mine poor, but likely to improve. Mina Grande improving.

### NEW EAST LODE, AND PROVIDENCIA.

May 18.—The green ore is, if anything, increasing in the Providencia and Purisima stopes, and also in the red lode over the level of the tunnel. I have this week stopped the 32 cross-cut east, as the end is now in solid porphyry, and shall await your instructions before driving it further, as we have no indication of any lode going down that would be to the east of us in the 32. Were we in limestone I would advise its continuance; as it is it would be driving on speculation of meeting with a distinct parallel lode, of which we have no indication of the existance. Instead, I made a careful inspection of the 32 and 20 north, and decided to put the men into the 32 north to drive the end, the appearances for ore being better than in the 20 end.

May 21.—New East Lode: This lode has lengthened to 80 ft., and at the south end improves—stones of grey copper ore giving by assay $200 per ton for silver and 40 per cent. copper. Of course, these stones were selected. This week we have proved that the lode goes down and enters our old works in the 10, where it was cut through in a poor floor of ground. From the 10 we are putting up a rise, and shall hole to the winze next week, and at once, by stoping, prove the length of the ore bunch at this point. Our old works for some distance being directly under the lode, which is here very flat, I do not think there is much hope of its going below the 10, but this we shall prove. The cross-cut east from this lode, on the tunnel level, progresses slowly; the ground is hard to break, and for almost the first time in the mine the water begins to be really heavy. We are still in the lode, and the water keeps east of us. Should the water continue as at present it will be a very valuable addition to our supply. The ground we are cutting through contains specks of very rich ore occasionally, and I think the cross cut should be continued until we meet the country ground to the east, to prove from whence the water proceeds, as throughout the mines water has been a pretty certain indication of the presence of a lode.—Providencia: The end in the 32 north is in the same easy ground, with now and then spots of green ore. We are still driving on the same strong wall that we have had throughout this level.

June 1.—New East Lode: The winze was this week holed to the back of the 10, and we now find the lode forms a splice a few feet over the back of the 10 with an unworked part of the black lode, which is too poor to pay for working alone. Now we have commenced stoping, and shall carry up the two lodes together as far as the west lode will pay, and afterwards confine our stopes to the new lode.—Providencia: During the week we have had a change of ground in the 32, in the Providencia Mine. In driving north we now are in hard spar, with stones of green ore, assaying as broken, without being cleaned, $150 per ton. As we drive the

ground is becoming harder, and we appear to be past the broken ground through which we have driven for the past 80 ft. The lode is solid, and we have more hope than for some time past of its making ore.

Telegram received July 10.—The new east lode, Providencia, more coppery, and lengthening north.

TIRITO.

May 18.—The Tirito shaft is still in easy ground, and 45 ft. below the 32.

May 25.—The engine-shaft is sunk below the 32 fm. level 47 ft. 3 in.; ground continues fair for sinking. In the Red lode, over the back of the Tunnel, the ore continues very fair, yielding sufficient green ore to make an appreciable difference in our returns. The red ore (from which we select the double cross marked) is keeping well up to average, as is also the black ore, which still continues on the side of the lode. This lode has lengthened north and south to 83 ft., and will average 10 to 12 ft. wide; it is at present the best stope we have in the mine, and gives every promise of continuing.

June 1.—The engine-shaft is now down 50 ft. below the 32 fm. level; the ground is unchanged.

Telegram received July 10.—Tirito shaft is sunk to the 42 fm. level, and cross-cutting to the lode.

## FOREIGN MINES.

ST. JOHN DEL REY.—Telegram from Morro Velho, dated Rio de Janeiro, July 6. Produce eleven days, second division of June, 12,750 oits.=4940*l.*; yield 7·1 oits. per ton.

DON PEDRO.—Telegram from Rio, dated July 8: Produce for June, 5000 oits.

RICHMOND CONSOLIDATED.—Telegram: Week's run, $57,000.

— R. Rickard, June 23: The ground in the 700 drift is more favourable for driving than it was last week. Good progress is being made in the sinking of the shaft. No alteration in any of the stopes since last; still looking very well. We have resumed the sinking of the winze on the west side of the hill; the bottom is all in ore of good quality. This winze and the Lizette tunnel are being pushed on as fast as possible to make communication between these two points.—Smelting: The three big furnaces are working well; so is the new hydrocycle. The latter is doing good work, quite equal to any of the big furnaces.

CHICAGO (Silver).—Telegram: The net profit for June is $10,000. We have run two furnaces 25 days. Furnaces stopped for repairs. Resume smelting July 14.

ALMADA AND TIRITO.—Telegram from Mr. Breach: Labour scarce. Tirito shaft sunk to the 42, and cross-cutting to lode. The new east lode, Providencia, more coppery, and lengthening north. Mina Grande improving.

BIRDSEYE CREEK.—G. S. Powers, June 20: The water has been falling here rapidly since the 18th inst.; at that date we turned in the last of the suplus water from Steep Hollow, and to-day there is not more than 450 in. coming through the Birdseye ditch. I was at Nevada and made arrangements with the South Yuba Canal Company for 300 in., to be turned on to-day, with an understanding that the amount is to be increased as required. The agent thought he would be able to furnish the Birdseye Company with one head up to Oct. 1 if required.

— Telegram: We have cleaned up after a run of 30 days. The gross returns are $4250, and the profit $2250. Remittance, $2000.

EXCHEQUER (Gold and Silver).—L. Chalmers, June 19: The engine-shaft is now down 379 ft., and in better working rock. The north drift from the 300 is in 379 ft. in very hard rock. The north drift at the 200 is in 456 ft.; the lode is getting larger as we drive on it. I have commenced stoping at the 200, and sent for eight more men to prosecute stoping at all the levels this mail, so as to give me the requisite supply of ore when new furnace is erected.

PESTARENA UNITED (Gold).—July 7: District of Val Toppa: In Zero level we are continuing the third cross-cut westward in favourable ground. This cross-cut was driven in June month 2·55 metres, and is set to six men for July at 120 frs. per metre.—Intermediate Level below Zero: End south, on the western lode, advanced 1·50 metre; re-set for July at 200 frs. per metre, to five men. We estimate the lode in this end to yield 12 tons of ore per fathom, worth 1 oz. of gold per ton. The new stope in bottom, behind this end, yields 9 tons per fathom, at 12 dwts. per ton; worked by five men, at 25 frs. per metre. From the drive on this lode, in north end of ground, we sunk in June a winze 1·35 metres; lode producing 8 tons per fathom, at about 8 dwts. per ton; set to two men for July, at 102 frs. per metre.

Great Quartz Lode: In the north end of ground, above No. 2 level, 1·10 metre was driven; this end is suspended for the purpose of taking down a piece of the lode—about 5 ft.—standing in the western side. The whole width of lode in this end of ground is about 10 ft., and we estimate it to be worth at this point 7 dwts. of gold per ton. The rise behind this end was put up in June 1·70 metre; the lode produces 10 tons per fathom, worth 7 dwts. per ton; it is set to two men for July, at 90 frs. per metre. The drive in south end of ground, under No. 2 level on the great quartz lode, advanced 3 metres; the lode produces 8 tons per fathom, worth 8 dwts. per ton; this end is suspended, and the stopes behind end resumed by four men, at 80 frs. per metre, where we estimate the lode will produce 12 tons of 7 dwt. ore per fathom.

New and Flat Lodes: In the stopes in bottom of No. 2 level, south of the 4th cross-cut, we have an improvement, now worth 10 tons per fathom, at 15 dwts. per ton; this place is being worked by four men. The stopes in bottom of No. 2 level, south of winze, on this lode and branches, yield 8 tons per fathom, estimated to be worth 10 dwts. per ton. The end north of winze, on the turn of the flat lode and branches, was driven in June 2·35 metres, where it proves to be poor and has been suspended; with this pare of men—four in number—we have commenced a new stope in back, behind the end, where we estimate the lode will yield 8 tons of ore per fathom, worth about 8 dwts. of gol.l per ton.

Lode and Branches, East of New Lode: On this we drove in July, south of 4th cross-cut, 1·75 metre, communicating to the old sink as anticipated, thereby opening up 20 metres of level for stoping, and on the 1st we commenced a new stope in the back, by two men, where we estimate the lode and branches will yield 6 tons per fathom, worth 10 dwts. per ton. In No. 3 level we have for some time past been driving southward from the 1st cross-cut east on a small lode, by one man, and I am pleased to state that it improves as we advance; the small lode is now 12 in. wide, of quartz, carrying pyrites; a mill trial and assay of the ore from this end will be made shortly.

District of Pestarena, Pescheira Department: The 33 end north on No. 2 lode was driven 3·20 metre; price given to two men for July was 55 frs. per metre; lode small. No. 1 stope, in the back on this lode north, was stoped in the past month 24·21 metres; price given to four men for July 15 frs. per metre; the lode yielding about 4 tons to the fathom. No. 2 stope, in the back of this lode south of new cross-cut, was stoped 23·70 metres; price given to four men for the present month 15 frs. per metre; lode yielding 2½ tons per fathom. No. 3 stope, in the back of the same level south on No. 2 lode south of first cross cut was stoped in the past month 23·27 metres; set to four men for July at 15 frs. per metre; lode composed of quartz and pyrites, and worth about 4 tons to the fathom. In the stopes in the bottom of the 33, on this lode south of new cross-cut, 7·40 metres was accomplished in June; price given to two men for July 15 frs. per metre; the lode yielding 2 tons of ore per fathom.—The 55 North of New Incline: No. 1 stope in the back 24·22 metres; price given to four men for July 12 frs. per metre; lode yielding 4 tons of ore per fathom. We hope to be able to increase the men in this stope shortly. No. 2 stope in the back of this level 9·19 metres was stoped in June; this stope is suspended for the present, having removed this pare of men to the 55 level to cross-cut westward with a view to reach No. 2, 4, and 5 lodes. This cross cut is set to four men for July month at 85 frs. per metre. The new incline shaft was sunk 3·40 metres; lode producing in the bottom 8½ tons of ore per fm. of shaft. This shaft is now down under the 80 fm. level 24 metres, and at this depth we intend driving a 90 fm. level, but before commencing the driving of the 90 we intend to sink the shaft about 4 more metres for a fork for water.

Aquavite Department: No 1 stope, in the back of the 23 north stope, was sunk in June 14·58 metres; price to four men for the present month 20 frs. per metre; lode yielding 2½ tons of ore per fathom. In No. 2 stope in the back of the 23 north, 15·92 metres was stoped; price for July 20 frs. per metre; lode yielding 4 tons of ore per fathom. Stopes in the back of the deep adit north 9·96 metres; lode droducing 8 tons per fathom, and set to three men for July at 18 frs. per metre.—Surface: Good progress is being made in preparing for the erection of four small trial mills, and if possible they will be completed this month, when we shall be in a better position for reporting on the value of the ore coming from the different points of operation. On the 24th of last month we started the six additional amalgamating mills, and I am pleased to state that they are now working satisfactorily. Towards the tail of the deep adit a small excavation has been made.

The following are the returns for the month of June:—From Val Toppa district, 215 ozs. 11 dwts. 23 grs., obtained from 372 metric tons; yield per ton, 11 dwts. 13¼ grs. From Pestarena district, 49 ozs. 14 dwts. 6 grs., obtained from 94 metric tons; yield per ton, 10 dwts. 14½ grs. Total production for June from the two districts, 265 ozs. 6 dwts. 5 grs of gold, from 466 metric tons of ore amalgamated.

CAPE COPPER.—Capt. Tonkin, May 31: Ookiep: The forebreast of the 80 fm. level east is not at present producing any ore, but in the side of the driving there there are some very good lumps of copper ore of rich quality. We have now started to drive north in the above-named level in the productive ground that was cut through a short time ago. The stope in the back of the 80 fm. level continues to look well. At this point we are carrying forward a large tunnel, about 18 feet wide by 13 ft. high, and it produces a good quantity of high percentage copper ore. No. 19 winze, below the 68 fm. level, is going down in a splendid bunch of ore: this sinking has now reached a depth of 28 ft. from the bottom of the level, and its deepest point is worth fully 8 tons of rich copper ore per cubic fathom. The 68 east, from No. 13 winze, was worth about 4 tons per fathom for the greater part of the month, but within the last few days it has fallen off in value: however, I think it will improve again shortly. The cross-cut north, from the side of the 68, has been driven through some poor ground, but the present end shows considerable improvement, being now worth 3 tons per fathom, and from its present appearance I think it will still further increase in value. The winze below the 58 fm. level north east has passed through some very good ore ground; this sinking has failed lately, having cut into a poor floor of ground, but I have no doubt it will shortly be again very productive. We are pushing forward the 48 fm. level east in ground that is congenial for the production of copper ore, but the end of the driving does not at present yield a sufficient quantity to value. We are carrying out large stopes in the 68 in various directions, and we find the ore ground extending in a very satisfactory manner. The various stopes in the 58 and upper levels are holding on well, and continue to give the estimated yield of copper ore.

Spectakel.—Capt. Tonkin, Capt. Ninnis, May 25: The 36, north of incline, is yielding a small quantity of copper ore, and the ground has a good appearance, consequently we continue to push the trial forward, as there is a chance of intersecting some ground of value. The 27, east from the flookan course, is at present worth 1½ ton of copper ore per cubic fathom. We have taken several tons of ore from the stopes in sides of this driving, but just now they are poor. However, there is a probability that this eastern driving will by-and by intersect some moderately good bunches of ore. The 27, south-west under incline, is in poor and unpromising ground, consequently we have suspended the driving in that direction, and put the men to cross-cut from the side of the level. The stopes throughout the mine are looking much the same as for some time past, and the increase in the returns is partly owing to the late rains, which enabled us to carry on our dressing operations regularly, and to treat some of the raisings of former months.

Trial Mines.—Capt. Tonkin, Capt. Lanksbury, May 15: The 20, east from shaft at Karolusberg, produces some copper ore of good quality, but not enough to value. The 10 east continues to look promising, and yields about ¾ ton of ore per fathom. The cross-cut south from side of the 10 is in hard and poor ground. At Nababeep we have been considerably hindered of late through the large influx of water from the end of the 17, west of new shaft. At present the men are engaged in building dams in order to stop the flow of water into the mine, and we hope shortly to be enabled to resume the driving of the trial levels without the aid of expensive pumping machinery. The 17, north of shaft, is being driven through very kindly ground, and the present end is yielding 1½ ton of copper ore per fathom. The cross-cut from side of level at Kilduncan has not improved in appearance, consequently we have suspended the driving, and put the men to work on some indications in the old workings near the surface. The 20, from bottom of shaft at Narrap, is at present producing a little copper ore of moderate quality, but no value can be attached to it.

Returns for May: Yield from Ookiep, 950 tons of 25* per cent. From Spectakel, 57 tons of 28 per cent. [* In reference to the low assay of the Ookiep return Capt. Tonkin states that owing to the delay in getting the new hauling engine to work, &c., he had been compelled to add some of the poor surface reserves to the month's yield from the mine, and the dressing work was temporarily interfered with by the setting in of the wet season and the consequent shortness of labour, as some of the native labourers, as usual at this season, were at work for the farmers.]—Bills of Lading Received: 475 tons of ore per Brunette.—Arrival at Port Nolloth: The Muriel to load about 380 tons of ore.—Put Forward for Sale: 512 tons of ore on July 18.

## THE SITUATION OF COPPER.

The American copper market has weakened considerably of late, notwithstanding the unusually large shipments of that metal to Europe, and the still larger quantities engaged to follow in the same direction during the remainder of the year. The fact is that activity in brass manufacture in the United States has not come up to expectations, and there is no prospect of a revival. Manufacturers of copper and brass are known to have very light stocks, however, and any sudden resolution on their part to replenish would find the market in a position favourable to holders, the new copper arriving being mostly sold ahead. In Europe, on the contrary, up to quite recently, the tendency has been rather an upward one, for various reasons, which we shall endeavour to explain upon an examination of the latest statistics at hand. Leaving out the 1475 tons afloat for Europe from Australia, advised by mail, and the 2500 tons afloat and chartered from Chili, advised by cable, we find the following— *Visible supply of copper in Europe.*

| | 1876. | 1875. | 1874. |
|---|---|---|---|
| Stock at Liverpool and Swansea, Chili bars ..Tons | 9,643 | 12,965 | 20,253 |
| Stock at London, English and Australian ..... | 7,304 | 7,695 | 7,619 |
| Stock at Havre, Chili bars, &c. ..... | 4,388 | 2,466 | 2,775 |
| Chili, chartered and afloat, by mail ..... | 10,819 | 7,037 | 6,350 |
| Total ..... | 32,154 | 30,163 | 36,997 |
| Price of Chili bars (May 1) ..... | £79 10s. | £83 | £74 |
| Imports, four months .....Tons | 19,667 | 23,697 | 22,373 |
| Deliveries, four months ..... | 18,779 | 21,329 | 20,570 |

From the foregoing it will be seen that the actual stock of Chili bars has run unusually low at Liverpool and Swansea, but the deficiency is compensated by the excess afloat. Both the stock and the amount on the way was, however, held by strong parties, and as the smelters had run rather short in their available supply of West Coast and other copper, the London importers up to the present month of June have been enabled to uphold rather stiff figures. The advance thus gradually brought about was further sustained by the general statistical position of copper. The import was some 4000 tons less, while the deliveries have fallen behind about as much. So far as statistics can show, there was, consequently, nothing of an exciting nature at hand, the demand for manufactured copper being quite slack. It was understood, however, that for war purposes a great deal of copper has been absorbed this year, and a large part of the amount afloat from the West Coast goes direct into the hands of the French military authorities.

Considering the dulness in the European metal trade, it must be confessed that copper has done remarkably well, which was mainly due to this uninterrupted Government demand. When the year opened it was apprehended that any weakness that might be inherent in the copper situation would be found and developed in Europe, and that the metal was safe enough here.

During the current month of June Chili bars, as well as best selected, have been gradually yielding some 2*l.* or 3*l.* in the London market, in anticipation of the Wallaroo auction sale, but the same thing happened two months ago, when a rebound soon followed, the market on the other side may soon right again.

Our own market has shown increased weakness lately from dulness in trade, and it remains to be seen whether some combination during the next few months will be resorted to, with a view to sustaining a market at present wholly unsupported by a domestic demand.—*Iron Age* (New York), June 29.

## A WONDERFUL DISCOVERY.

REVELATION OF PROCESS OF FORMATION OF ANTHRACITE COAL.

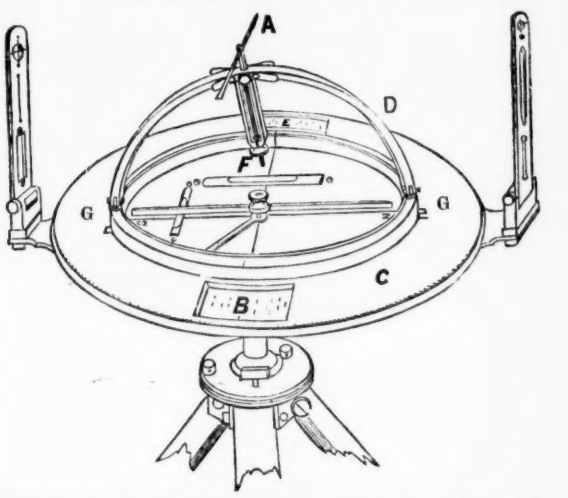
We have before us now on our table a specimen which is one-half anthracite coal and the other half a solidified sediment that four years ago was all soft sediment. For over four years there has been in use in the Indian Ridge shaft of the Philadelphia Coal and Iron Company, in this district, a wooden pipe, about 6 in. in diameter, made of inch boards nailed together, which served to carry water from one of the rings in the shaft to the lower level. The rings are boxes around the sides of the shafts which catch the water coming out of the rock, slate, or coal, and are put in to prevent the water from falling down, and making a regular shower bath of the shaft. At the rink in question a large spring in the slate, about 30 ft. below the primrose vein, had been struck, the water from which is apparently as pure as crystal.

Some four months since it was found that this wooden pipe had become so clogged with the reddish-brown sediment that is deposited by all mine water that the open space in it was not more than 2 in. in diameter, and not large enough to carry off the water from the ring. Consequently, a new pipe was put in, and the old one, nearly closed with the sediment adhering to its sides, was left standing. The water was then turned into the new pipe, and cut off from the old one, which is some 50 ft. or over in length. On Friday last, after remaining in the shaft without any water passing through it for over four months, the greater part of this old pipe was taken out, and when broken open the wonderful phenomenon presented itself that the sediment was gradually changing into what appeared to be anthracite coal. About ½ in. of the inside of the sediment lining the pipe had changed into coal, and the remainder was also gradually changing, the only portions of the sediment remaining quite soft being that part deposited first, and next the sides of the pipe. A cross section of the pipe now shows, commencing at the centre, first a circle of about ½ in. in diameter surrounding the 2-in. opening remaining in the pipe, then a circle of sediment partly turned into coal, and then the sediment in its natural state, and the sides of the pipe. The surface of sediment which was exposed to the action of the atmosphere has changed first, and the influence or chemical combinations which had changed its nature were gradually operating on the rest of the sediment. The process of formation is plainly seen in the sediment next that already turned into coal.

Samples of coal taken from the pipe have been tried on the blacksmith fire at the colliery, and it makes an exceedingly hot fire, but being of a softer nature than the natural anthracite, it clinkers badly. Fortunately there are any quantity of samples of this wonderful formation, and those who are unwilling to believe without themselves seeing and touching, can be accommodated. There is no Keely-motor business about this discovery. A section of the pipe about 16 ft. long has been left standing in the shaft, to see what results will follow in the next six months or year. Samples have also been sent to Gen. Pleasants, at Pottsville, for examination, and we suppose the public will soon have the opinion of gentlemen qualified to judge on this surprising formation; but if anthracite coal will form from sediment deposited by mine water when exposed to the action of the atmosphere under certain conditions for a period as short as four months, what becomes of all the pet theories of the geologists and mining engineers on the subject? How about the great heat, the millions of years of time, and tremendous pressure which, according to the various theories of the heretofore-accepted authorities, were necessary to account for our deposits of the finest and best fuel yet found?—*Shenandoah Herald.*

LATEST FROM THE TIN MINES OF NEW ENGLAND.—The following is a description of the New England tin mines by a gentleman by whom they have been recently visited:—Mining operations throughout that district are almost at a standstill for want of water, and have been for some months. The only claim at Vegetable Creek in work carried on to any great extent is that of Messrs. O'Dally and Co., where eighty hands are employed. The last dividend of this company, paid a short time since, amounted to 14,000*l.* for 18 months' work, and the returns, we are informed, continue as good as ever. Several other claims on the Creek are engaged raising wash, but very few have a sufficient supply of water for sluicing operations, and consequently the average yield of ore from this portion of the district is comparatively small. At the Y waterhole, the necessary element is more plentiful, and mining, consequently, more vigorously proceeded with, but we are not in a position to give a detailed account of the operations. At Tent Hill there is plenty of tin, but no water to wash it, and from this cause mining operations are at a standstill. The Tent Hill Smelting Works have been idle for some time, pending the completion of certain alterations and improvements in the furnace, at which eight hands have been constantly employed, and smelting operations will shortly be resumed. At the Mole Tableland mining progress is said to be also seriously impeded for want of water, and there is very little doing there at present. The current price of ore in the Vegetable Creek district last week was about 28*l.* per ton, though few sales have been effected.—*Sydney Herald*, May 5.

## DAVIS AND COCHRANE'S PATENT SELF-RECORDING DIAL.




The miner's dial, or circumferenter, illustrated above, and for which a patent has lately been granted, is entirely of novel construction, the advantage claimed for it is accuracy in taking angles, though by surveyors of even small experience; the tediousness of surveying is very much lessened as the instrument requires no reading.

The following description will serve to explain its construction. B and E are exposed portions of a metallic paper margin or ring about 8½ in. outside diameter and 1½ in. wide, which margin is fixed to the base plate of the dial, and to which also the sights are attached. The base plate moves freely round, carrying the sights and paper margin, leaving the compass, the covering plate, C, and remaining parts of the dial clamped to the legs. At D is a semicircular arm, working over the compass on axes at G, G; this arm carries a brass marker, A, which at one end is pointed, and at the other flat or knife edged. The paper margin is protected by a brass cover, C, which is fixed to the body of the dial, and only exposes the paper where required at the openings B and E, and for further protection a small shutter covers these open spaces while carrying the dial. If the pit should be very damp or dirty it would be an extra precaution to use a double paper margin with a sheet of carbon paper between them; by this means a duplicate would be taken of all the angles of the survey.

The first process is to set this dial to the north point, and then to bring down the marker, A, and puncture the paper both at B and E; these markings will give the north and south lines on the paper margin. Then take the angle required in the usual manner, and puncture the paper again, numbering each puncture on the margin; these numbers are booked, with distances, &c., to each. If two or more punctures should fall together on the paper margin the marker, A, may be elongated by the screw, F, so that half a dozen or more punctures may indicate the same angle without making any confusion in the margin. In plotting the survey the paper margin is removed from the dial, the north line or points on the paper margin are made to coincide with the north line on the plan, and the survey is plotted without the aid of the protractor, the paper ring serving as protractor, and giving all the angles required.

When the dial is required for setting out a paper protractor is supplied in place of blank paper margin, and the angles read off by means of the marker, A. This instrument is manufactured by Messrs. John Davis and Son, of Derby.

COAL.—The quantity of coal, &c., exported in the six months ended the 30th ult. was 7,491,077 tons, against 6,197,209 in the corresponding period of 1875. The value in the last six months was 4,221,865*l.*, and in the previous year 4,348,293*l.*

THE BIRLEY COLLIERY ACCIDENT.—In the House of Commons, on Tuesday, Mr. Macdonald asked the Home Secretary whether he had seen it stated in a report of an inquest on the death of three men by an accident at Birley Colliery, near Sheffield, on the 26th ult., that there were only two safety-lamps for the mine; whether that be true; whether it be true that fire-damp had been seen in the mine in the month of April; and if, in consideration of the finding of the jury, he intended to direct that the manager and the underviewers be proceeded against for the offence contemplated in the 61st clause of the Coal Mines Regulation Act, 1872?—Mr. Cross said that the statements in the question were substantially true. He had at once, on learning their truth, directed that proceedings should be taken against those in charge of the mine.

GEOMETRICAL CHEMISTRY.—The introductory memoir on Geometrical Chemistry by Dr. HENRY WURTZ, of New York, has been reprinted in pamphlet form, and should be carefully read by all interested in the science. The general view appears to have been adopted from the treatise on Atomechanics published some years since by Prof. Gustav Hinrichs, of the State University of Iowa, but it is somewhat more elaborate, and whilst Hinrichs gave the name of pantogen to an imaginary element from which all others are formed, Wurtz leaves the question in doubt, although admitting a uniformity of results which could scarcely be expected without assuming the existence of the primary with which the multipliers are used. Dr. Wurtz thinks—1. That the volumes of all single chemical molecules, whether of elements or of radicals—with the one sole exception of oxygen—are expressible by quantities having at the temperature of incipient ice-fusion the relation of even cubes of a series of whole numbers, of which series the number pertaining to the molecule of ice at this temperature is 27°.—2. That by the geometric law of molecular symmetry, a molecule added to a congeries tends to assume a diameter already present, or a diameter next below or above one, or between two already present, in such manner that the tendency is more and more towards the formation of a succession of proximate or successive diameters becoming more regular as the compound molecule becomes more complex. He proposes to call such an engymmetrical congeres of elemental molecules when regular and complete, or nearly so, a plesymmetrical molecule, or more simply, a plesymmeter.—3. That by the geometric law of molecular cratesis the tendency of an elementoid molecule to vary according to the diametric ratios in combining with other elementoid mocules is in proportion to its basicity or electro-positive attitude relative to the other elementoid molecules present. If the views of Wurtz be correct, it is probable that those of Hinrichs were equally so, and it may be hoped that the two professors will form a chemical combination of more extensive industrial application than either pantogen or cratetic influences. Dr. Wurtz considers his discovery as valuable as that of Kepler with reference to the planetary system, so that chemists can scarcely fail to recognise its importance.

# HALF-YEARLY BRITISH MINING SHARE LIST, JAN. TO JUNE, 1876.

SHOWING THE PRICES OF THE LONDON MARKET ON THE 1ST JANUARY AND THE 30TH JUNE, 1876, AND THE LOWEST AND HIGHEST PRICE FOR THE SIX MONTHS JANUARY TO JUNE, INCLUSIVE.

CONTRIBUTED BY **Mr. EDWARD ASHMEAD**, LONDON MINING AGENT AND ACCOUNTANT, 62, CORNHILL, LONDON, E.C.

THE FOLLOWING LIST EMBRACES THOSE MINES IN WHICH DURING THE PAST SIX MONTHS THERE HAVE BEEN FREQUENT DEALINGS AND CONSTANT QUOTATIONS, AND NOT THOSE IN WHICH THERE HAVE BEEN BUT FEW TRANSACTIONS AT LONG INTERVALS. IT MAY BE OBSERVED THAT SOME MINES ARE NOT INCLUDED, ARISING FROM THEIR SHARES BEING FIRMLY HELD, AND NO DEALINGS OR PRICES REPORTED. MINING SHARES HAVING THEIR TRANSACTIONS EXCLUSIVELY IN PROVINCIAL MARKETS WILL NOT BE FOUND IN THIS LIST.

| Mine and County. | Mineral. | Shares. | Paid. | Price. Jan. 1, 1876. | January. Lowest. | January. Highest. | February. Lowest. | February. Highest. | March. Lowest. | March. Highest. | April. Lowest. | April. Highest. | May. Lowest. | May. Highest. | June. Lowest. | June. Highest. | Price. June 30, 1876. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CORNWALL—West** | | | | | | | | | | | | | | | | | |
| Agar, Wheal | Copper | 6000 | 11½ | 1⅜ to 2 | 1⅜ | 3½ | 2⅛ | 3½ | 2 | 2⅞ | 2 | 2¾ | 2 | 3 | 2¼ | 3 | 2¼ to 2⅜ |
| Basset, West | ditto | 6000 | 5 6 8 | 5¼ | 4 | 6 | 5 | 6 | 4 | 6 | 4 | 5 | 4½ | 5½ | 4 | 5 | 4 4½ |
| Basset, Wheal | ditto | 512 | 11 2 6 | 20 25 | 20 | 30 | 15 | 30 | 7½ | 15 | 6 | 10 | 6 | 13 | 10 | 20 | 15 20 |
| Botallack | Tin and copper | 200 | 11 6¼ | 40 45 | 40 | 45 | 37½ | 40 | 25 | 37½ | 24 | 31 | 25 | 50 | 35 | 50 | 35 45 |
| Cargoll | Lead | 3348 | 6 2 0 | ⅛ ⅜ | ⅛ | 1⅛ | 2⅛ | 43 | 1 | 2 | 1 | 2 | 1 | 5 | 3¾ | 5 | 4 5 |
| Carn Brea | Tin and copper | 1000 | 35 0 0 | 38 40 | 36 | 40 | 30 | 43 | 27½ | 32½ | 27½ | 31 | 28 | 42 | 35 | 38 | 36 38 |
| Carn Brea, South | ditto | 5000 | 2 17 0 | 1¼ 1½ | 1⅛ | 1⅜ | 1⅛ | 1⅜ | 1⅛ | 1⅜ | 1 | 1⅛ | 1⅛ | 1⅜ | ⅞ | 1⅜ | ⅞ 1⅛ |
| Cathedral | ditto | 10,000 | 1½ | 1 1½ | 1 | 1⅛ | 1¼ | 1⅜ | 1¼ | 1⅜ | 1¼ | 1⅜ | 1⅛ | 1⅜ | 1⅛ | 1⅜ | 1⅛ 1¼ |
| Chiverton, New | Lead | 3000 | 6 0 0 | 6½ 7 | 6½ | 7 | 6 | 6½ | 6 | 6¾ | 6½ | 6¾ | 6¼ | 6½ | 6 | 6½ | 6 6¼ |
| Chiverton, West | Lead and blende | 3000 | 12½ | 15 15½ | 15 | 18 | 17 | 18½ | 18½ | 20 | 16½ | 20 | 16 | 17½ | 15½ | 18 | 16½ 17½ |
| Condurrow, South | Tin and copper | 6123 | 6 5 6 | 5 5⅛ | 5 | 6 | 4½ | 5½ | 4 | 4⅝ | 3½ | 4⅝ | 3¼ | 5 | 3¼ | 5 | 4 5 |
| Cook's Kitchen | Tin | 2450 | 22 9 9 | 5½ 6 | 4½ | 6 | 4 | 5 | 2⅝ | 4 | 2½ | 3½ | 2¼ | 5½ | 2¼ | 6 | 3 3¼ |
| Crofty, South Wheal | Copper | 937 | 36 0 0 | 17½ 18½ | 15 | 20 | 15 | 18 | 14 | 18 | 16 | 18 | 14 | 18 | 14 | 17 | 15 17 |
| Dolcoath | Tin | 4296 | 10 10 8 | 40 42 | 39 | 42½ | 37 | 43 | 34 | 37 | 33 | 36 | 33 | 38 | 34 | 38 | 34 36 |
| Frances, South Wheal | Copper | 4500 | 6 8 4 | — | — | — | — | — | — | — | 1½ | 2 | 1⅜ | 2 | ⅞ | 1⅛ | ⅞ 1 |
| Frances, West Wheal | Tin | 2048 | 27 3 9 | 8½ 9 | 8¼ | 9 | 8 | 9 | 7 | 9¼ | 7 | 9 | 7 | 8 | 6¾ | 8 | 7 7¼ |
| Godolphin, West | ditto | 5000 | 1 13 6 | 2 2¼ | 1¾ | 2⅛ | 1⅝ | 2¼ | 1½ | 2⅜ | 1¼ | 1⅝ | 1 | 1⅜ | ¾ | 1⅛ | ¾ 1 |
| Grenville, Wheal | Copper | 5179 | 11 16 6 | 1⅛ 1⅜ | 1⅛ | 1⅜ | 1⅛ | 2¼ | 1⅛ | 2⅜ | 1⅛ | 1⅜ | ¾ | 1⅛ | ¾ | 1⅛ | ¾ 1 |
| Jane, Wheal | Tin | 2048 | 1 15 0 | 3¼ 3⅜ | 3¼ | 4 | 3 | 4 | 2½ | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 4 |
| Kitty, Wheal (St. Agnes) | ditto | 4295 | 5 4 6 | 2¾ 3 | 2 | 3 | 2¼ | 3½ | 2 | 2¾ | 2 | 2¾ | 2 | 2¾ | 2 | 2¾ | 2¼ 2⅜ |
| Lovell, East Wheal | ditto | 1906 | 6 19 0 | 5 6 | 3 | 6 | 3 | 5½ | 3 | 5 | 1 | 3 | 2 | 4 | 1 | 3 | 1 2 |
| Peevor, Wheal | ditto | 3000 | 6 5 0 | 2 2½ | 2 | 2½ | 2 | 2⅝ | 1¾ | 2½ | 2 | 2⅝ | 2 | 2⅝ | 2 | 2⅝ | 2⅛ 2⅜ |
| Penstruthal | Tin and copper | 45,793 | 2 0 0 | 8s. 10s. | 8s. | 11s. | 8s. | 11s. | 5s. | 10s. | 7s. | 11s. | 9s. | 13s. | 12s. 6d. | 18s. | 15s. 6d. 16s. |
| Pool, East | ditto | 6400 | 0 9 9 | 13 13½ | 13 | 14 | 13½ | 15 | 12¼ | 14½ | 12½ | 13½ | 12½ | 14 | 12½ | 13¾ | 12½ 13¼ |
| Providence | Tin | 1120 | 17 16 7 | 1½ 2 | 1½ | 3 | 2 | 3½ | 1 | 3 | 2 | 3 | 1 | 3 | 1 | 2½ | 1 2 |
| Relistian Consols | Copper | 6000 | | | | | | | | | | | | | | | |
| Rosewarne, New | ditto | 5000 | 5 17 0 | | | 1 | | 1⅛ | | 1 | | | | | | | |
| Seton, West Wheal | ditto | 600 | 40 0 0 | 40 42 | 37 | 42 | 35 | 40 | 32 | 40 | 27½ | 36 | 27½ | 35 | 25 | 42½ | 37½ 42½ |
| Tincroft | Tin | 6000 | 9 0 0 | 20 21 | 19 | 21 | 18 | 23 | 17½ | 19 | 16½ | 18½ | 17 | 20 | 17 | 20 | 18 20 |
| Tolgus, West Wheal | Copper | 512 | 95½ | 60 62½ | 59 | 66 | 62½ | 68 | 62½ | 72 | 63 | 70 | 61 | 64 | 60 | 69 | 60 62½ |
| Trebeigh Consols | Lead | 12,000 | 0 4 0 | | 7s. 6d. | 11s. | 9s. | 11s. | 7s. 6d. | 12s. 6d. | 7s. 6d. | 12s. 6d. | 7s. 6d. | 10s. | 5s. | 8s. | 5s. 8s. |
| Unity Wood | Tin and copper | 5174 | 3 18 0 | 1½ 1⅝ | 1½ | 1⅝ | 1½ | 1⅝ | 1½ | 1⅝ | 1½ | 1⅝ | 1½ | 2 | 1½ | 2 | 1¾ 1⅞ |
| Uny, Wheal | Tin | 4096 | 13 6 6 | 1⅞ 2 | 1½ | 2 | 1⅝ | 2 | 1 | 2 | 1½ | 1⅝ | 1 | 1⅛ | ¾ | 1 | 1 1⅛ |
| Vor, Great Wheal | Tin and copper | 5908 | 41 2 6 | 2⅞ 3⅛ | 2 | 3⅛ | 1⅝ | 2½ | | | ½ | 1⅝ | ⅛ | 1½ | ⅛ | ⅜ | ⅛ ⅜ |
| **CORNWALL—East** | | | | | | | | | | | | | | | | | |
| Caradon, East | Copper | 6144 | 2 14 6 | 1½ 1⅝ | 1 | 4½ | 2⅛ | 3 | 1¾ | 2⅜ | 1½ | 1⅝ | 1½ | 1⅝ | 1 | 1⅜ | 1⅛ 1⅜ |
| Caradon, Glasgow | ditto | 40,000 | 1 0 0 | 1⅛ 1⅜ | 1⅛ | 1⅜ | 1 | 1⅛ | 1 | 1⅛ | 1 | 1⅛ | 1 | 1⅛ | 1 | 1⅛ | 1 1⅛ |
| Caradon, South | ditto | 512 | 1¼ | 120 130 | 120 | 140 | 120 | 150 | 125 | 140 | 130 | 140 | 110 | 140 | 100 | 130 | 110 130 |
| Gunnislake (Clitters) | ditto | 9830 | 5¼ | 3 3½ | 3 | 3½ | 2 | 3½ | 2½ | 3½ | 3 | 3½ | 3 | 3½ | 2 | 3½ | 2 3 |
| Herodsfoot | Lead | 1024 | 8 | 3 3½ | 3 | 3½ | 3 | 4½ | 3 | 4½ | 3 | 3½ | 3 | 4½ | 3 | 4½ | 3 3½ |
| Hingston Down | Copper | 18,000 | 1 0 0 | 1 1⅛ | 1 | 1⅛ | 1 | 1⅛ | 1 | 1⅛ | 1 | 1⅛ | 1 | 1⅛ | 1 | 1⅛ | 1 1⅛ |
| Marke Valley | ditto | 9000 | 5 0 6 | 3 3½ | 3 | 4 | 2 | 3¼ | 2½ | 3¼ | 1⅝ | 2⅛ | 1⅝ | 2¼ | 1⅝ | 2¼ | 1⅝ 2 |
| Prince of Wales | ditto | 12,800 | 1 9 0 | 4s. 6d. 5s. | 4s. | 8s. | | 5s. | 2s. 6d. | 5s. | 3s. 6d. | 7s. 6d. | 2s. 6d. | 7s. 6d. | 2s. 6d. | 10s. | 7s. 9s. |
| Treburgett, Old | Lead | 27,855 | 1 0 0 | 4s. 6s. | 4s. | 12s. 6d. | | 17s. 6d. | 7s. | 12s. 6d. | 5s. | 10s. | 7s. 6d. | 10s. | 4s. | 10s. | ¼ ½ |
| **DEVON.** | | | | | | | | | | | | | | | | | |
| Bedford United | Copper | 12,000 | 1⅝ | 1 1¼ | 1 | 1⅛ | 1 | 1⅛ | 1 | 1¼ | 1 | 1⅛ | 1 | 1⅛ | ⅞ | 1⅛ | 1 1⅛ |
| Crebor, Wheal | ditto | 6000 | 4 1 0 | 2⅛ 2⅜ | 2⅛ | 2⅜ | 2 | 2⅛ | 2 | 2⅛ | 2 | 2⅛ | 2 | 2⅛ | 1⅞ | 2⅛ | 2 2⅛ |
| Devon Great Consols | ditto | 10,240 | 1 0 0 | 4¼ 4⅜ | 4 | 4⅜ | 4 | 5 | 4 | 4⅜ | 3⅜ | 4½ | 3 | 4 | 2⅞ | 3¼ | 2¼ 2⅜ |
| Gawton | ditto | 3950 | 4 1 6 | ¼ ⅜ | ¼ | ⅜ | ¼ | ½ | ¼ | ½ | ⅜ | ½ | ⅜ | ½ | ⅜ | ½ | ⅜ ½ |
| New Consols | ditto | 20,000 | 3 0 0 | 1¼ 1½ | 1¼ | 1⅝ | 1⅛ | 1½ | 1 | 1⅜ | ¾ | 1 | ½ | 1 | ½ | 1 | ½ 1 |
| **DURHAM.** | | | | | | | | | | | | | | | | | |
| Rookhope | Lead | 15,000 | 1½ | — | — | — | 1¼ | 1⅜ | ⅛ | 1½ | 1 | 1⅛ | 1 | 1⅛ | ⅝ | 1⅛ | ⅝ ⅞ |
| **YORKSHIRE.** | | | | | | | | | | | | | | | | | |
| Craven Moor, West | Lead | 3000 | 10 0 0 | 10 10½ | 10 | 11 | 10½ | 11½ | 11 | 12 | 10 | 12 | 11 | 11½ | 10 | 11 | 10 11 |
| Pateley Bridge | ditto | 4000 | 5 0 0 | 4¾ 5⅛ | 4⅜ | 8 | 6 | 7⅜ | 5¼ | 6¼ | 4 | 5¼ | 3½ | 4⅝ | 3½ | 4½ | 3½ 4 |
| Pateley Bridge, West | ditto | 4000 | 5 0 0 | — | — | — | 5¼ | 6 | 5¼ | 5¾ | 5¼ | 5¼ | 5 | 5½ | 5 | 5½ | 5 5¼ |
| **SHROPSHIRE.** | | | | | | | | | | | | | | | | | |
| Ladywell | Lead | 12,000 | 2½ | 2 2½ | 2 | 2⅝ | 2½ | 2⅞ | 1⅞ | 2⅛ | 1 | 1⅞ | 1¼ | 1⅜ | 1¼ | 1⅜ | 1⅛ 1⅜ |
| Pennerley | ditto | 12,000 | 2 0 0 | 1⅛ 1⅜ | 1⅛ | 1⅜ | 1⅛ | 1⅜ | 1⅛ | 3¼ | 1⅜ | 2⅜ | 1⅛ | 3 | 1⅜ | 2⅜ | 1⅛ 2 |
| Roman Gravels | ditto | 12,000 | 7¼ | 12 12⅝ | 11⅝ | 14½ | 14 | 15 | 13½ | 14½ | 13 | 15 | 15 | 15½ | 14⅝ | 15½ | 14⅝ 15⅜ |
| Roman Gravels, South | ditto | 18,000 | 1½ | — | — | — | 18s. 6d. | 1½ | 1⅛ | 1⅜ | 1 | 1½ | 1 | 1⅛ | 1 | 1⅛ | 1 1⅛ |
| Tankerville | ditto | 12,000 | 6 0 0 | 10½ 11 | 10½ | 12½ | 12½ | 13 | 11 | 12⅝ | 10⅜ | 12 | 10½ | 11⅞ | 9½ | 11 | 10 10⅜ |
| Tankerville, West | ditto | 12,000 | 3 0 0 | 1⅞ 1⅜ | 1⅝ | 2⅛ | 2 | 2⅜ | 1⅝ | 2⅛ | 1⅜ | 2⅛ | 1⅝ | 2¼ | 1⅝ | 2¼ | 1⅝ 2⅛ |
| **ANGLESEA.** | | | | | | | | | | | | | | | | | |
| Parys Mountain | Copper | 16,923 | 3 0 0 | ½ ⅝ | ½ | 1½ | 19s. | 24s. | 15s. | 1 | ⅝ | ¾ | 14s. | 1 | 15s. | 20s. | ¾ ⅞ |
| **CARDIGAN.** | | | | | | | | | | | | | | | | | |
| Cwmystwith, South | Lead | 6000 | 0 10 0 | 1½ 2 | 1½ | 2½ | 1½ | 2⅜ | 1½ | 2½ | 1½ | 2⅜ | 2 | 2½ | 2 | 2⅜ | 2 2⅛ |
| Darren, East | ditto | 300 | 32 0 0 | 25 30 | 25 | 30 | 25 | 30 | 25 | 30 | 25 | 27 | 25 | 27 | 25 | 27 | 25 27 |
| Goginan, West | ditto | 12,000 | 2 0 0 | 1⅜ 2⅛ | 1⅜ | 2⅛ | 2 | 2⅜ | 2 | 2⅜ | 2 | 2⅜ | 2 | 2½ | 2 | 2⅜ | 2 2⅛ |
| Grogwinion | ditto | 20,000 | 2 0 0 | 3 3½ | 3 | 6⅝ | 5 | 6⅝ | 5½ | 6½ | 5 | 6½ | 5½ | 7 | 5 | 7 | 6 7 |
| Lisburne | ditto | 400 | 18⅜ | 50 55 | 50 | 55 | 50 | 55 | 50 | 55 | 55 | 60 | 55 | 60 | 55 | 60 | 55 60 |
| Monydd Gorddu | ditto | 13,000 | 5 0 0 | 5½ 6 | 5½ | 6 | 3½ | 5½ | 3½ | 5 | 3½ | 5 | 3½ | 5 | 3½ | 5 | 4 5 |
| Van, Great West | ditto | 25,000 | 2 0 0 | ½ ¾ | ½ | ¾ | 1 | 1 | ½ | ¾ | ¾ | ¾ | ½ | ¾ | | 14s. 6d. | ½ ⅝ |
| **CARNARVON.** | | | | | | | | | | | | | | | | | |
| Assheton | Lead | 12,000 | 5 0 0 | 1⅝ 1½ | 2 | 2 | 1½ | 2½ | 1½ | 2 | 1¼ | 2 | 1 | 1⅞ | ⅝ | 1⅞ | ⅝ 1⅛ |
| Assheton, West | ditto | 12,000 | 1 0 0 | 1⅞ 2 | 1⅞ | 2 | 1⅝ | 2½ | 1⅝ | 2⅛ | 1⅝ | 2¼ | 1⅝ | 2⅛ | 1⅝ | 2⅛ | 1⅝ 1⅞ |
| Port Nigel | ditto | 10,000 | 2 0 0 | 1 1½ | 1 | 2 | 1⅝ | 2 | 1¼ | 1⅝ | 1 | 1⅝ | 1¼ | 2 | 1¼ | 2 | 1¼ 1⅝ |
| **DENBIGH.** | | | | | | | | | | | | | | | | | |
| Minera | Lead and blende | 9000 | 5 0 0 | 5 6 | 5 | 6 | 5 | 12 | 10 | 13 | 12 | 13 | 10 | 13 | 10 | 17½ | 15 17½ |
| **FLINT.** | | | | | | | | | | | | | | | | | |
| Prince Patrick | Lead | 18,000 | 1 0 0 | 2½ 3 | 2⅛ | 3⅛ | 2 | 3 | 2 | 3⅛ | 2 | 2½ | 2 | 2⅝ | 2 | 2⅝ | 2 2⅜ |
| St. Patrick | ditto | 10,000 | 1 0 0 | 1¼ 1⅜ | 1¼ | 1⅜ | 1⅛ | 1⅜ | 1¼ | 1⅜ | 1¼ | 1⅜ | 1¼ | 1⅜ | 1¼ | 1⅜ | 1¼ 1⅜ |
| Pennant | Lead and barytes | 6000 | 5 0 0 | 5 5½ | 5 | 5½ | 5 | 5½ | 5 | 6 | 5 | 6 | 5 | 5½ | 5 | 5½ | 5 5⅛ |
| **MONTGOMERY.** | | | | | | | | | | | | | | | | | |
| Dyliffe, Great | Lead | 15,000 | 4 0 0 | — | — | — | — | — | 4½ | 5 | 4½ | 5 | 4½ | 5 | 4 | 5 | 4½ 5 |
| Glyn | ditto | 10,000 | 2 0 0 | — | — | 1⅜ | 2⅛ | 2 | 1⅝ | 2½ | 2½ | 6 | 3 | 4½ | 2⅝ | 3½ | 3 3½ |
| Harmon, St. | ditto | 12,000 | 3 0 0 | — | — | — | — | — | — | — | — | — | 3 | 3½ | 3 | 3½ | 3 3½ |
| Llanidloes | ditto | 14,000 | 3 0 0 | 3 3½ | 3 | 3⅜ | 3 | 3⅜ | 3 | 3½ | 3½ | 3⅝ | 3 | 3½ | 3 | 3½ | 3 3½ |
| Plynlimmon | ditto | 12,000 | 2½ | ¼ ⅜ | ¼ | ⅜ | ⅛ | ⅜ | ⅛ | ⅜ | ⅛ | ⅜ | 8s. | 11s. | | | |
| Van | Lead and blende | 15,000 | 4½ | 32½ 33½ | 32½ | 40 | 36 | 41 | 38 | 42½ | 38 | 41 | 38 | 41 | 36 | 39 | 36 38 |
| Van Consols | Lead | 20,000 | 2½ | 1⅝ 1⅞ | 1⅝ | 3½ | 2 | 3 | 1⅞ | 2⅛ | 2⅛ | 2⅜ | 1⅞ | 2⅜ | 1⅞ | 2⅛ | 1⅝ 2 |
| Van, East | ditto | 15,000 | 5 0 0 | 2⅜ 3 | 2⅜ | 22½ | 20½ | 22½ | 9½ | 21⅝ | 8½ | 11½ | 9 | 12 | 7½ | 10½ | 7½ 8 |
| Wye Valley | ditto | 10,000 | 3 0 0 | 5 6 | 5 | 8 | 6½ | 8 | 6 | 7⅜ | 6 | 7⅛ | 6½ | 8 | 6 | 7⅜ | 6 7 |
| Wye Valley, West | ditto | 12,000 | 3 0 0 | 3¼ 3½ | 3¼ | 4½ | 4 | 4⅝ | 3⅞ | 4½ | 3⅝ | 4½ | 3⅝ | 4½ | 3⅝ | 4⅝ | 3⅝ 4⅛ |
| **ISLE OF MAN.** | | | | | | | | | | | | | | | | | |
| Glenroy | Lead | 2000 | 4 0 0 | — | — | — | — | — | — | — | — | — | 6½ | 7 | 5½ | 8 | 6½ 6⅝ |
| Laxey, Great | Lead and blende | 15,000 | 4 0 0 | 15 16 | 15 | 17½ | 17 | 20 | 17¼ | 19 | 17 | 19 | 17 | 18 | 16⅜ | 17¼ | 16½ 17½ |
| Laxey, North | Lead | 25,000 | 2 0 0 | ½ ⅝ | ½ | 1⅛ | 1 5-16 | 2¼ | 1 | 1⅛ | ⅞ | 1⅛ | 19s. | 1⅛ | ¾ | 1⅜ | ¾ 1 |

PATENT

# "INGERSOLL ROCK DRILL,"

LE GROS AND CO.,

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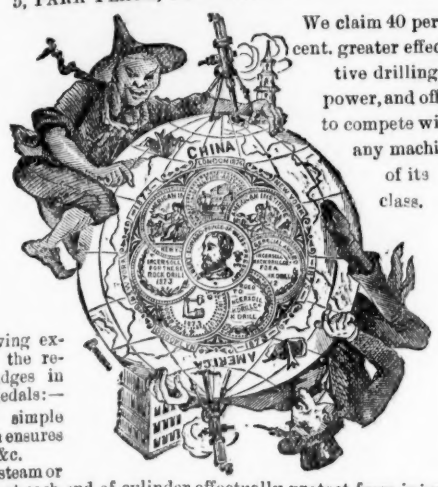


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"5. Its having an automatic feed, giving it a steady motion, &c.

"6. Its greater steadiness and absence of jar and vibration experienced in other drills, which is very destructive to their working parts, &c.

"7. Its greater power is some FORTY PER CENT. in favour of the Ingersoll."

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# BLAKE'S PATENT STEAM PUMP.

## MORE THAN 8000 IN USE.

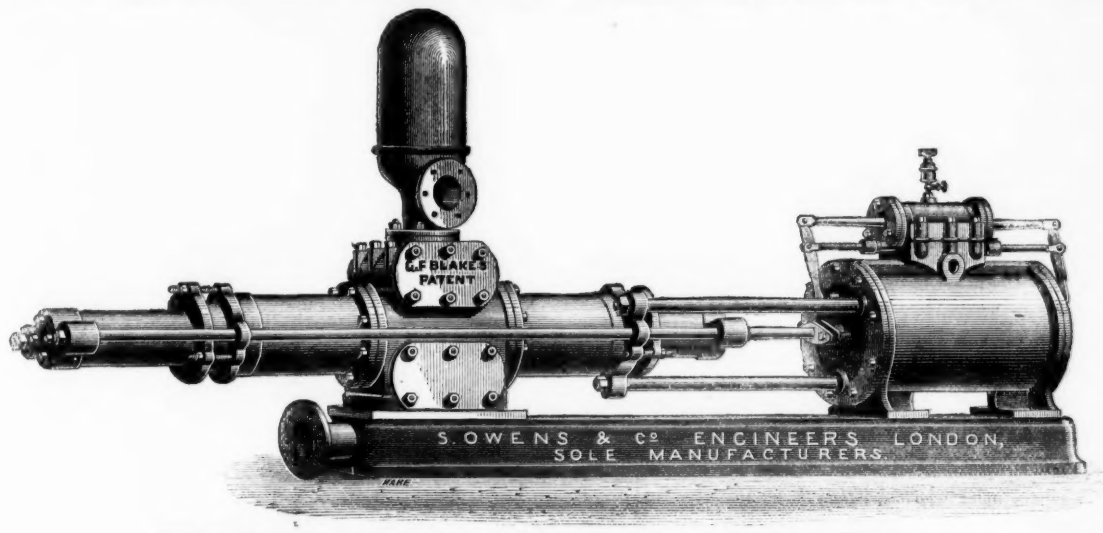
SOLE MAKERS FOR GREAT BRITAIN,

# S. OWENS & CO.,

## Hydraulic and General Engineers, Whitefriars-street, London;

## And at 195, Buchanan-street, Glasgow (W. HUME, AGENT).

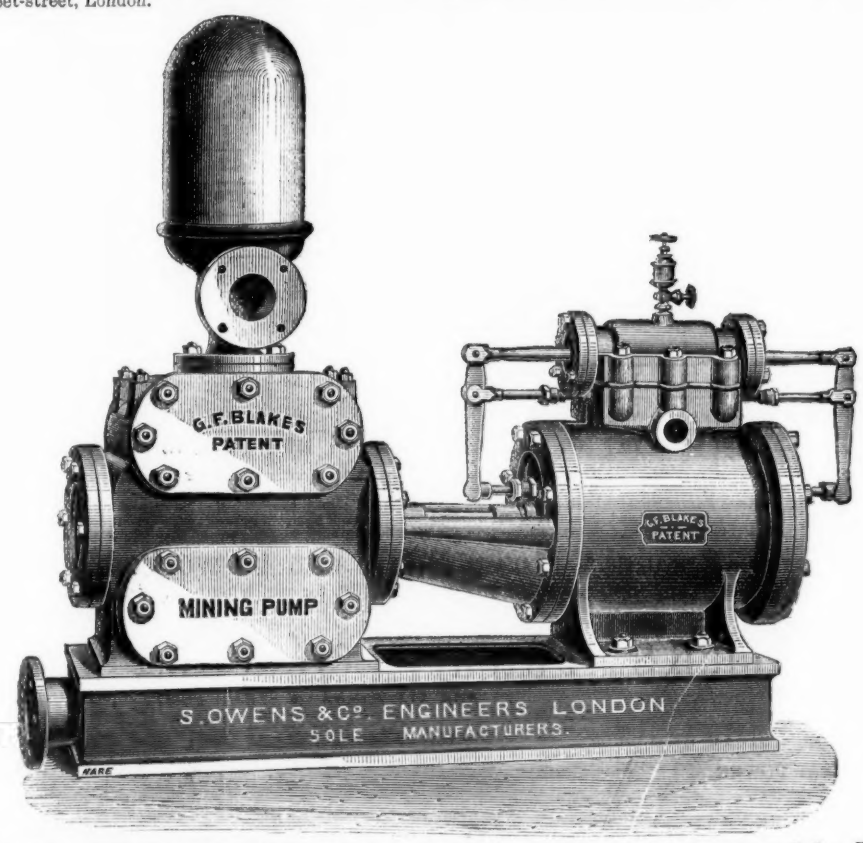
These PUMPS from their SIMPLICITY, RELIABILITY, DURABILITY, and ECONOMY are SPECIALLY SUITED FOR MINING PURPOSES, where large quantities of water require to be raised from great or medium depths with CERTAINTY. They are double-action in their construction, throwing a constant stream of water, can be made of any stroke to suit the space in which they have to work, can be arranged with any combination of steam and water cylinders to suit the pressure and lift against which it is desired to work them, are made of the very best materials and highest class of workmanship, and all working parts can be readily got at by any ordinary workman, and replaced if necessary by a duplicate part (all such being interchangeable) in the shortest possible time. For situations where gritty and sandy water has to be pumped the DOUBLE-PLUNGER PATTERN is recommended. Where space is limited the PISTON PUMP is better suited, a novel feature of which is the PATENT REMOVEABLE LINING, which can be removed in a few minutes and substituted with a new one, without disturbing any other part of the pump.




## Blake's Improved Double-plunger Steam Pump.

## S. OWENS AND CO.,

In placing the BLAKE STEAM PUMP before the mining world, believe they are offering the BEST, MOST RELIABLE, and ECONOMICAL PUMP that has yet been made, and solicit an inspection of various sizes in operation at their works, Whitefriars-street, Fleet-street, London.




## Blake's Improved Mining Pump, with Patent Removeable Lining to Pump Cylinder,

Any combination of these Pumps may be had to suit circumstances. The following are some of the SIZES SUITABLE FOR MINING PURPOSES:—

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dia. of steam cylinders.. In. | 12 | 12 | 12 | 12 | 14 | 14 | 14 | 16 | 16 | 16 | 16 | 18 | 18 | 18 | 18 | 20 | 20 | 20 | 20 | 24 | 24 |
| Dia. of water cylinders.. In. | 3 | 4 | 5 | 6 | 4 | 5 | 6 | 4 | 5 | 6 | 8 | 4 | 5 | 6 | 8 | 5 | 7 | 8 | 9 | 6 | 8 |
| Length of stroke ..... In. | 18 | 18 | 18 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 30 | 30 | 30 | 30 | 30 | 36 | 36 | 36 | 42 |
| No. of strokes per minute.. | 30 | 30 | 30 | 30 | 25 | 25 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 20 | 20 | 17 | 17 | 17 | 15 |
| Quantity in gallons per hour, approxmately ... | 1440 | 2610 | 4200 | 5940 | 2940 | 4620 | 6600 | 2646 | 4158 | 5940 | 10620 | 2646 | 5160 | 7500 | 13260 | 4586 | 9000 | 12360 | 15660 | 6720 | 20 |

PRICES FOR THE ABOVE, OR ANY SPECIAL SIZE, AND ILLUSTRATED CATALOGUES FURNISHED ON APPLICATION.

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Can be supplied for any size pump to effect a saving of fully 30 per cent. in the consumption of fuel, greatly increasing their efficiency

## The Blake Pump will work under water, and as efficiently with compressed air as with steam.

BLAKE'S DONKEY PUMPS FOR FEEDING BOILERS KEPT IN STOCK.


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VIENNA EXHIBITION, 1873.


LONDON EXHIBITION, 1874.


CORNWALL POLYTECHNIC SOCIETY, 1867 and 1873.

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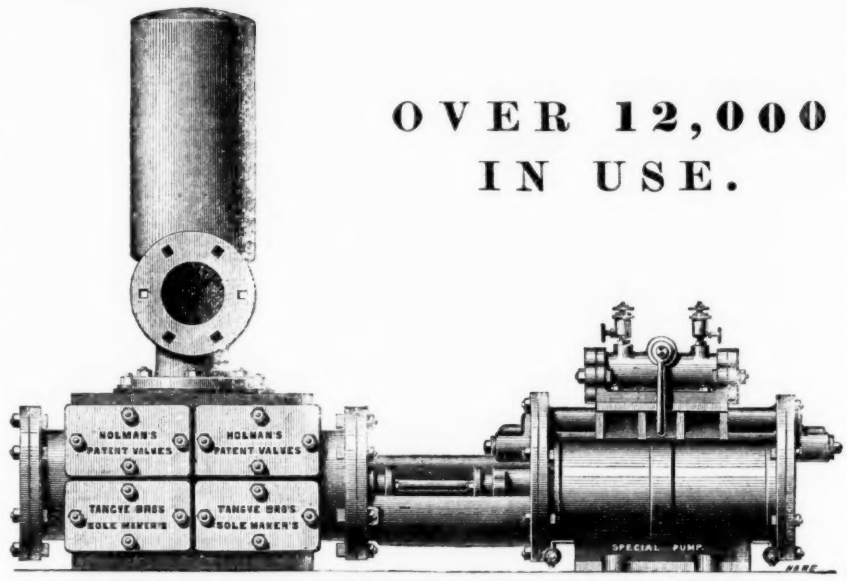
AND BIRMINGHAM, (TANGYE BROTHERS), CORNWALL WORKS, SOHO

FOR

# "THE SPECIAL" DIRECT-ACTING STEAM PUMP.

After eight years of successful application for all purposes to which steam-driven pumps can be applied, THE "SPECIAL" STEAM PUMP STILL MAINTAINS THE FIRST POSITION IN THE MARKET, notwithstanding that it alone—of all direct-acting pumps—has been subjected to the great variety of severe tests that must be encountered in such a period of time. Some valuable improvements have been suggested in the course of a long experience, and their adoption has rendered the apparatus at once the simplest and most certain in action. There is absolutely no extraneous gear, and the steam cylinder is *no longer than the pump*. The valves are of easy access, and are suited for pumping fluids and semi-fluids of almost any consistency.




**OVER 12,000 IN USE.**

WILLIAM ELLIOT, Esq., *of the Weardale Iron and Coal Company, writes under date Sept. 17th, 1875, as follows:*—"We have now THIRTY-FIVE of your SPECIAL STEAM PUMPS in operation at the various collieries under my charge—some of them employed pumping water out of our pits to the depth of 50 fms.—others employed in the pits, and a good many feeding Boilers. I have no hesitation in saying that we have found them the Cheapest and Best Pumps of the kind we have tried. I can with confidence recommend them to intending purchasers.

Messrs. BURT, BOULTON, and HAYWOOD, *Chemical Manufacturers, of London*, have also THIRTY-EIGHT of the "SPECIAL" STEAM PUMPS in use at their works, and continue to order more.

# GREAT REDUCTION IN PRICES.

*The following sizes are suitable for low and medium lifts:—*

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diameter of Steam Cylinder ...In. | 3 | 4 | 4 | 4 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 8 | 9 | 9 | 9 | 9 | 9 | 10 | 10 |
| Diameter of Water Cylinder ...In. | 1½ | 2 | 3 | 4 | 3 | 4 | 5 | 3 | 4 | 5 | 6 | 3 | 4 | 5 | 6 | 7 | 4 | 5 | 6 | 7 | 8 | 5 | 6 | 7 | 8 | 9 | 5 | 6 |
| Length of Stroke .....In. | 9 | 9 | 9 | 9 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 18 | 12 | 12 | 12 | 18 | 24 | 12 | 12 |
| Gallons per hour ..... | 680 | 815 | 1830 | 3250 | 1830 | 3250 | 5070 | 1830 | 3250 | 5070 | 7330 | 1830 | 3250 | 5070 | 7330 | 9750 | 3250 | 5070 | 7330 | 9750 | 13,000 | 5070 | 7330 | 9750 | 13,000 | 16,519 | 5070 | 7330 |
| **Price ..... .....£** | **16** | **18** | **20** | **25** | **22 10** | **27 10** | **32 10** | **25** | **30** | **35** | **40** | **30** | **35** | **40** | **45** | **50** | **40** | **45** | **50** | **55** | **65** | **50** | **55** | **60** | **70** | **85** | **55** | **60** |

*CONTINUED.*

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diameter of Steam Cylinder..In. | 10 | 10 | 10 | 10 | 12 | 12 | 12 | 12 | 12 | 12 | 14 | 14 | 14 | 14 | 14 | 14 | 16 | 16 | 16 | 16 | 16 | 18 | 18 | 18 | 18 |
| Diameter of Water Cylinder..In. | 7 | 8 | 9 | 10 | 6 | 7 | 8 | 9 | 10 | 12 | 7 | 8 | 9 | 10 | 12 | 14 | 8 | 9 | 10 | 12 | 14 | 9 | 10 | 12 | 14 |
| Length of Stroke .....In. | 12 | 18 | 24 | 24 | 18 | 18 | 18 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| Gallons per hour ... ..... | 9750 | 13,000 | 16,519 | 20,000 | 7330 | 9750 | 13,000 | 16,519 | 20,000 | 30,000 | 9750 | 13,000 | 16,519 | 20,000 | 30,000 | 40,000 | 13,000 | 16,519 | 20,000 | 30,000 | 40,000 | 16,519 | 20,000 | 30,000 | 40,000 |
| **Price .....£** | **55** | **75** | **90** | **100** | **75** | **80** | **85** | **110** | **120** | **140** | **110** | **120** | **130** | **140** | **160** | **180** | **140** | **150** | **160** | **180** | **200** | **180** | **190** | **210** | **230** |

Intending purchasers of Steam Pumps would do well to observe the great length of stroke, short steam cylinder, and short piston of the "Special" Steam Pump, as compared with the short stroke, long steam cylinder, and long piston of the Pumps of other makers, as the efficiency and durability of the machine, and the space occupied by same, greatly depend upon this. The advantage of long strokes will be obvious when purchasers are reminded that each set of suction and delivery valves of a "Special" Steam Pump with 24 in. stroke, running at 120 ft. per minute, would open and close only 30 times per minute, as against 120 times per minute in a Pump with only 6 in. stroke performing same duty.

## The Special" Steam Pump can be worked by Compressed Air as well as by Steam.

HUNDREDS of these PUMPS are USED for HIGH LIFTS IN MINES, for which purpose they are made with 21, 24, 26, 28, 30, and 32-inch Steam Cylinders, and 36 48 and 72-inch Strokes.

# Holman's Patent Self-acting Exhaust Steam Condensers,

FOR ALL KINDS OF STEAM PUMPS AND HIGH-PRESSURE STEAM ENGINES.

TURNS WASTE STEAM INTO GREAT POWER.

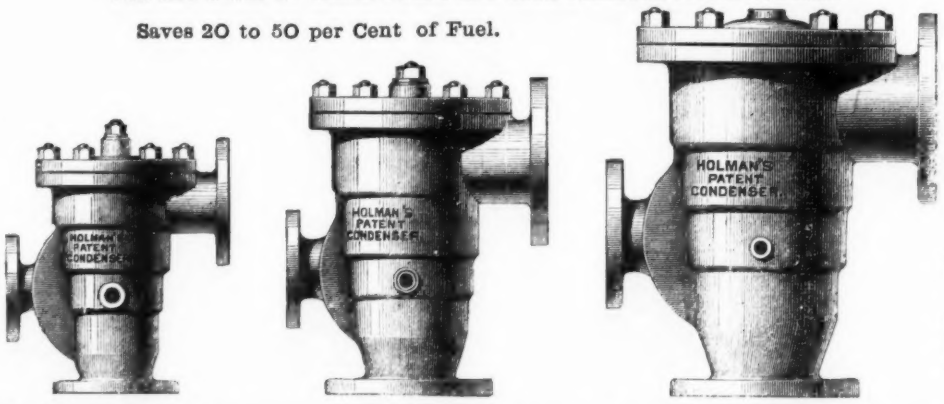
REQUIRES NO THREE-WAY COCKS, CHECK, or REGULATING VALVES.

SAVES HALF ITS COST IN PIPES AND CONNECTIONS.

PREVENTS ALL ESCAPE OF STEAM IN MINES OR ELSEWHERE.

REQUIRES NO EXTRA SPACE.

**Saves 20 to 50 per Cent of Fuel.**




These Condensers are made to suit any size and kind of Steam Pump. They form a part of the suction pipe of the Pump, and while they effectually condense the exhaust steam, they produce an average vacuum of 10 lbs. per square inch on the steam piston, increasing the duty of the Engine, and effecting a saving in fuel of from 20 to 50 per cent.

In Mining operations these Condensers will be of great value.

All Boiler Feeders are recommended to be fitted with these Condensers, as not only is the exhaust steam utilised in heating the feed water, but is returned with it into the boiler.

**The following Testimonial gives one Example of the Power Gained by the action of Holman's Patent Condensers:—**

MORLEY COLLIERY, WIGAN, October 16th, 1874.

Messrs. TANGYE BROTHERS AND HOLMAN.

GENTLEMEN,—I have great pleasure in recording my entire satisfaction with the working of the Holman's Patent Steam Pump Condenser which you have supplied to us. The complete condensation of the steam is, apart from its value in the strict economic sense, a most valuable feature in the drainage of underground workings. The perfect manner in which this important result is accomplished by your Condenser is extremely creditable to you, and merits the thanks and commendation of the Mining Engineer. When we start the "Special" Steam Pump the Condenser commences working automatically, and maintains a constant vacuum of 10¼ lbs. per square inch, even when we run the Pump upwards of 80 strokes (166 feet) per minute. It may perhaps be interesting to you to know that when we were running the Pump at 84 strokes (168 feet) per minute, the steam gauge indicating a steam pressure of 36 lbs. per square inch, 80 yards from the Pump, and the Condenser vacuum gauge on the exhaust pipe indicating a steady vacuum of 21½ inches, I turned the exhaust steam from the Condenser into the atmosphere, when the speed at once fell to 44 strokes per minute. The working economy thus shown is really so great that the cost of the Condenser must be saved in a very short time. (Signed) J. THOMPSON.

**Price from 30s. to 40s. per inch diameter of Steam Cylinder, according to the relative Diameter of Pump for which Condenser is required.**

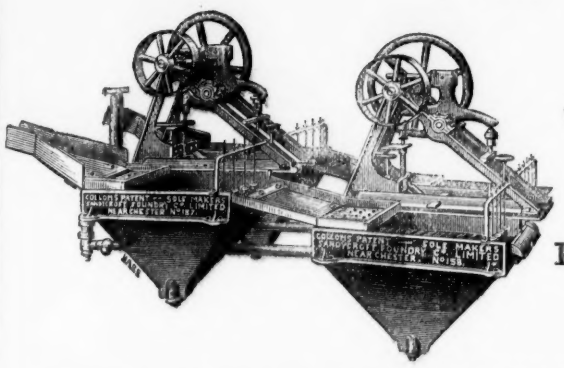
NORTH OF ENGLAND HOUSE ... ... TANGYE BROTHERS AND RAKE, ST. NICHOLAS BUILDINGS, NEWCASTLE-ON-TYNE.
SOUTH WALES HOUSE... ... ... ... TANGYE BROTHERS AND STEEL, Tredegar Place, NEWPORT, Mon.; and Oxford Buildings, SWANSEA.

# PATENT IMPROVED ORE WASHING & DRESSING MACHINES.

## THE SANDYCROFT FOUNDRY & ENGINE WORKS CO. (LIMITED), NEAR CHESTER

LATE THE MOLD FOUNDRY CO. (ESTABLISHED 1838).

SOLE MAKERS IN GREAT BRITAIN.



**HUNDREDS IN USE.**

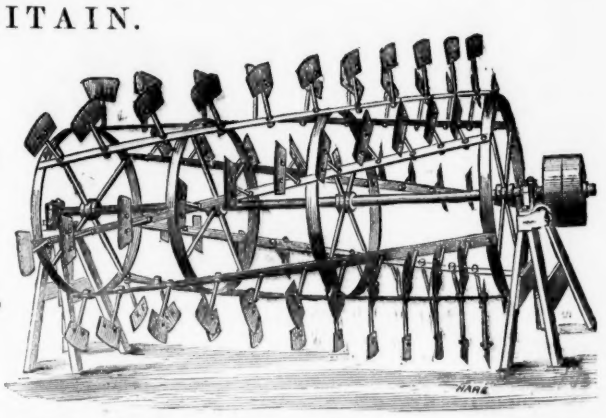
FULL PARTICULARS,
PHOTOGRAPHS, TESTIMONIALS, AND PRICES,
UPON APPLICATION.

Will supply Designs, and all the necessary Plant for laying out Dressing Floors; also

MANUFACTURERS OF EVERY VARIETY OF

## MINING MACHINERY

PUMPING & WINDING ENGINES,
PITWORK, CRUSHING MILLS,
ROLLS
OF PECULIARLY HARD AND TOUGH MIXTURE
&c., &c.



COLLOM'S PATENT AUTOMATIC ORE WASHING MACHINE, working at the following and many other Lead, Copper, Blende, and Tin Mines:—Great Laxey, Cape Copper, Pontgibaud, Linares, Alamillos, West Tolgus, Lisburne, Minera Halvans, Snailbeach, &c.; and also at Messrs. Vivian and Sons' Works, Swansea.

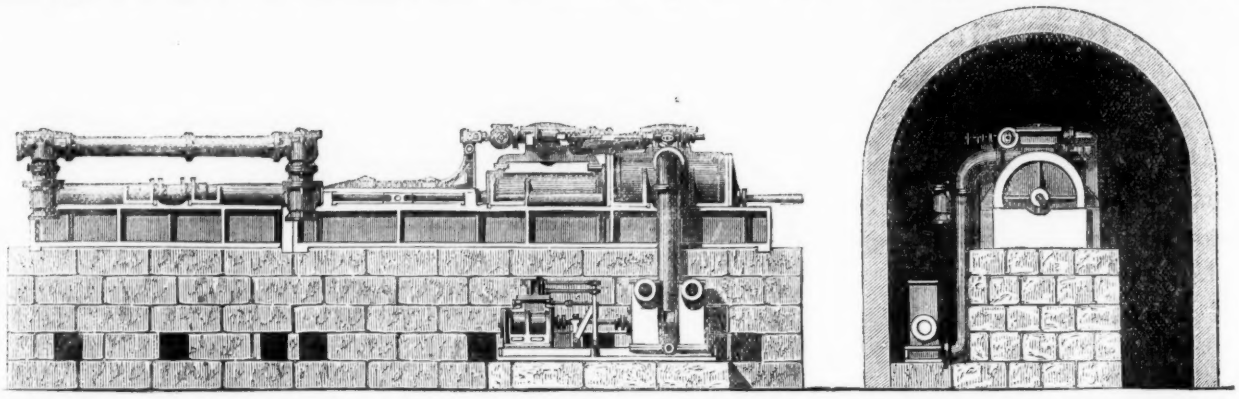
PATENT IMPELLER, OR KNIFE BUDDLE, in use at the following and many other Lead, Copper, Blende, and Tin Mines:—The Van, Roman Gravels, Tankerville, Ladywell, Lisburne, East Black Craig, Old Treburgett, Penhale & Barton, Bog, Linares, Fortuna, Alamillos, Minera Halvans, &c.

LONDON OFFICE: 6, QUEEN STREET PLACE, E.C.

# HATHORN, DAVIS, CAMPBELL, AND DAVEY,

MAKERS OF

**The Differential Pumping Engine, Hydraulic Pumping Engines, Cornish Engines, Differential Blowing Engines, Compound Rotative Engines, the Separate Condenser, Hydraulic Machinery, Mining Plant of all kinds, and Machinery for Water Supply, Irrigation, &c.**



## THE COMPOUND DIFFERENTIAL ENGINE AND FORCE PUMPS,

With Separate Condenser, as applied Underground, forcing 700 gallons per minute 920 feet high.

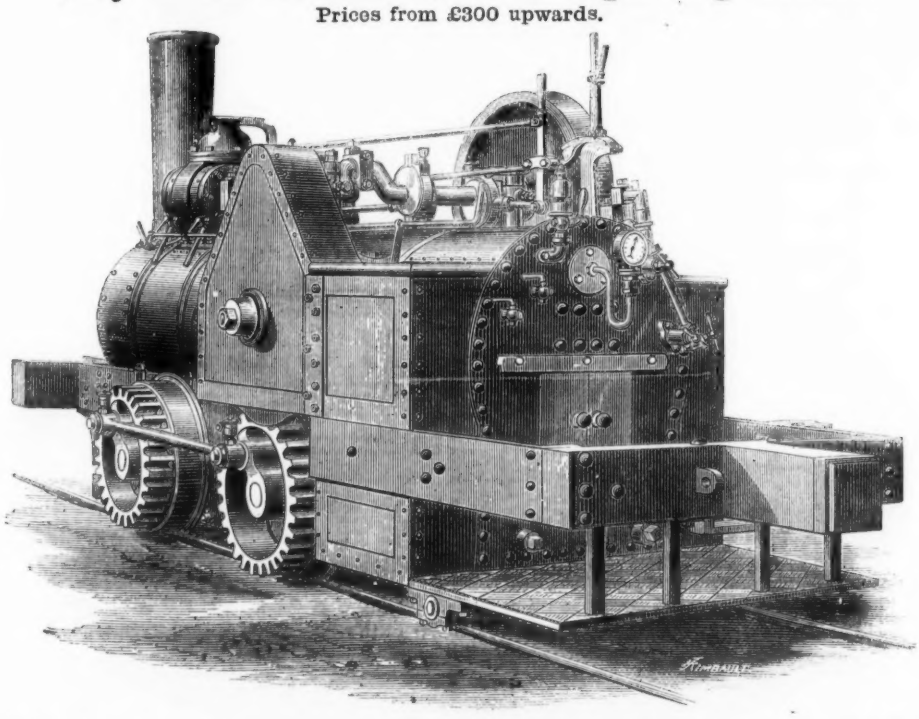
## SUN FOUNDRY, LEEDS.

FURTHER PARTICULARS ON APPLICATION

# LEWIN, POOLE, DORSET.

**Speciality in cheap colliery and contractors' Locomotives, and very small Locomotives for replacing Horses.**

Prices from £300 upwards.



## PORTABLE FIXED AND VERTICAL ENGINES.

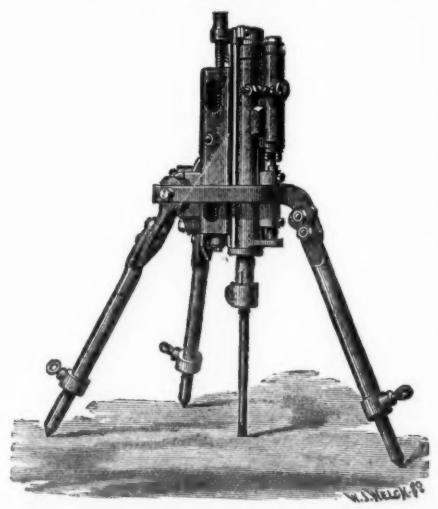
### WINDING AND PUMPING GEAR.

The above represents LEWIN'S STEEL-GEARED LOCOMOTIVE, from a photo of one working on a 22 in gauge, for replacing horses.

# THE "CHAMPION" ROCK BOR ER

**For Tunnels, Mines, Quarries,**

AND OTHER WORKS.



Intending purchasers can satisfy themselves that the advantages claimed for the "CHAMPION" over all other Rock Borers are not over-estimated.

For the amount of work it will do, it is the lightest, most compact, most durable, and cheapest in the market.

## IMPROVED AIR COMPRESSORS,

And other MINING MACHINERY.

ULLATHORNE & CO.
METROPOLITAN BUILDINGS,
63, QUEEN VICTORIA STREET, LONDON, E.C.

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